

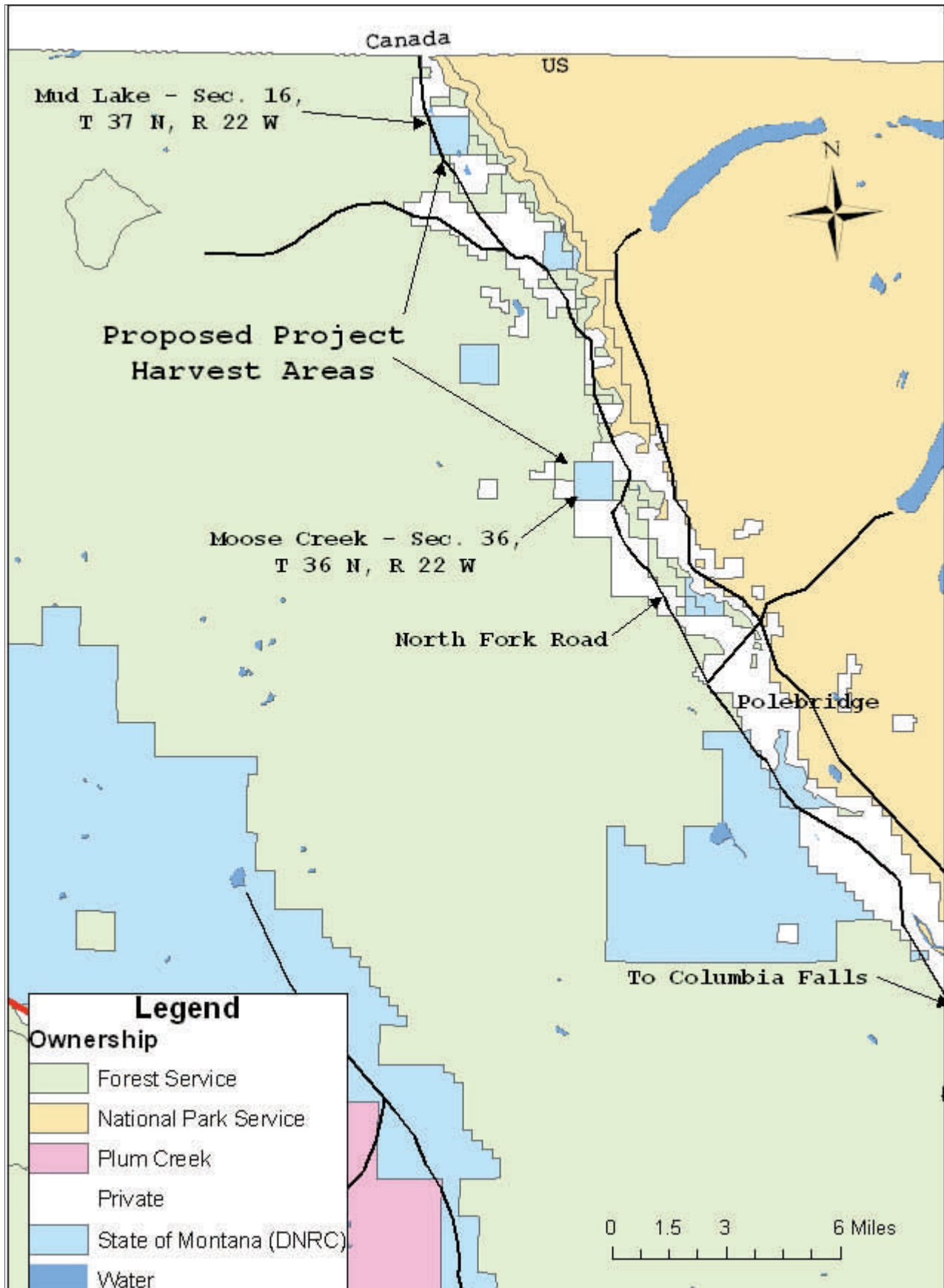


# **NORTH FORK BY TWO TIMBER SALE PROJECT ENVIRONMENTAL ASSESSMENT**

**March 31, 2008**

**Department of Natural Resources and Conservation - Stillwater Unit**

**NORTH FORK BY 2 TIMBER SALE PROJECT VICINITY MAP**



# **NORTH FORK BY TWO PROPOSED TIMBER SALE PROJECT**

## **FINDING**

An Interdisciplinary Team (ID Team) has completed the Environmental Assessment (EA) for the proposed North Fork by Two Timber Sale Project.

The project area is located on 2 sections of State land in Flathead County (see *VICINITY MAP* [inside front cover] for their general locations). Specifically, the project is located in Section 16, T37N, R22W, and Section 36, T36N, R22W. Revenue generated from these lands would benefit the Common Schools Trust.

After a thorough review of the EA, project file, public correspondence, Montana statutes, *State Forest Land Management Plan (SFLMP)*, and adopted rules, I have made the following 3 decisions:

### **1. ALTERNATIVE SELECTED:**

Two alternatives are presented and were fully analyzed in the EA:

- The No-Action Alternative includes existing activities, but does not include a timber harvest.
- The Action Alternative proposes to:
  - 1) Harvest 2 to 3 million board feet (MMbf) of sawtimber to (a) generate revenue for the appropriate school trusts and (b) contribute a sufficient amount of sawlog volume to meet the requirements of sustained yield for the DNRC timber-management program, as mandated by State Statute

77-5-222, Montana Codes Annotated (MCA).

- 2) Improve the long-term productivity of timber stands by increasing vigor, reducing the incidence of insect infestations and disease infections, and regenerating portions of the stands where growth is decreasing. Actions would be done in a manner that maintains site productivity and favors the retention and regeneration of appropriate species mixes (desired future conditions [Administrative Rules of Montana [ARM] 36.11.405]).
- 3) Reduce the potential of wildfires along the North Fork Road and in stands adjacent to private ownership and residences by reducing forest fuel loadings.
- 4) Secure permanent access into State lands through cost-share agreements with U.S. Forest Service (USFS) and purchase easements from adjacent private landowners.
- 5) Minimize the visual impacts of timber harvesting and road building on State lands in the project area.
- 6) Reduce the spread of noxious weeds with a monitoring and treatment program.

I have selected the Action Alternative with the following requirements and for the following reasons:

- Mitigations and specifications identified in the EA will be implemented as prescribed, as will the standard mitigations listed in *APPENDIX B - STIPULATIONS AND SPECIFICATIONS*.
- The Action Alternative meets the *PURPOSE OF PROPOSED ACTION*, (Page I-1) and *PROPOSED OBJECTIVES* (Page I-2); the specific project objectives are listed on page I-2 of the EA.
- The lands involved in this project are held by the State of Montana in trust for the support of specific beneficiary institutions. The Department of Natural Resources and Conservation (DNRC) is required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11; and, 77-1-202, MCA*). The *SFLMP* and associated rules provide the management philosophy and framework to evaluate which alternative would maximize real income while sustaining the production of long-term income.
- On March 13, 2003, DNRC adopted *Administrative Rules for Forest Management* (ARM 36.11.401 through 450). This project is designed in accordance with these Rules.
- The proposed timber sale project contributes to the harvest level mandated by State Statute (*Montana Codes Annotated [MCA] 77-5-222*).
- DNRC is required to salvage timber damaged by insects,

diseases, fires, or wind before value is lost to decay, provided such harvesting is economically warranted (*MCA 77-5-207*).

- The analyses of identified issues did not reveal information to persuade DNRC to choose the No-Action Alternative prior to this decision.
- The Action Alternative includes activities to address concerns expressed by the public and local government entities with jurisdiction; these include, but are not limited to, the following:

- 1) The project is designed to not harvest where potentially sensitive plant communities exist within wetland complexes. Portions of the project area were surveyed by a botanist to find and document the presence of plant species of concern as ranked by Montana Natural Heritage Program (MNHP). The botanist observed no sensitive plant species. Additionally, project activities will not take place in or immediately adjacent to the large wetland complex in the Mud Lake Section; harvest units have been designed to protect all wetlands involved.
- 2) The project is designed to retain trees of particular species, age class, and stocking densities. Additionally, postharvest activities such as planting and site preparation are designed to provide for regeneration. These actions should move the timber stands being entered toward desired future conditions.

- 3) Snags, snag recruits, and course woody debris will be retained in the area to provide for important wildlife habitat. Public access for motorized use will not change; thus, minimal change to elk security and grizzly bear security areas are anticipated (*Pages III-43 and III-61*).
- 4) With the location and design of harvest units and proposed transportation systems, no fisheries resources in the Mud Lake analysis area are expected to be affected by actions associated with the action alternative. No direct or indirect impacts to the presence or distribution of native bull trout, westslope cutthroat trout, or sculpin are expected in the Moose Creek analysis area (*Page III-30 and III-32*).
- 5) Approximately \$393,234 will be generated and deposited into the account of the Common Schools Trust; approximately \$68,250 will be deposited into the Forest Improvement account. (*Page III-35*)
- 6) State, private, and USFS haul roads used for project activities will be maintained to comply with Best Management Practices (BMPs). Grading, seeding, and dust abatement will be conducted as necessary. (*Page II-5*)
- 7) Proposed harvest treatments will reduce stocking densities and remove dead trees from existing timber stands. Postharvest hazard reduction, site preparation, and stand improvement work will reduce fuel loads. The combination of both harvest

and postharvest treatments should reduce the risk of large, intensive, stand-replacement wildfires on State lands and for adjacent neighbors. (*Page III-8*)

Refer to *APPENDIX B - STIPULATIONS AND SPECIFICATIONS* for a list of common mitigations applied to timber sale projects.

## 2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that implementing the Action Alternative will not have significant impacts on the human environment:

- I find that no impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that the identified adverse impacts will be avoided, controlled, or mitigated by the design of the project to the extent that the impacts are not significant.
- Locally Adopted Environmental Plans and Goals - In June 1996, DNRC began a phased-in implementation of the SFLMP. The SFLMP establishes the Agency's philosophy for the management of forested trust land. In May 2003, DNRC adopted rules concerning the SFLMP. The SFLMP philosophy and associated rules are incorporated in the design of the proposed project.

- Recreational Activities - Recreational opportunities will continue and will not be negatively affected by the proposed project.
- Precedent Setting and Cumulative Impacts - The project area is located on State-owned lands that are "principally valuable for the timber that is on them or for growing timber or for watershed protection" (MCA 77-1-402).
- Taken individually and cumulatively, the proposed activities are common practices and no project activities are being conducted on important fragile or unique sites.
- The proposed project conforms to the management philosophies of DNRC and is in compliance with existing laws, rules, policies, and standards applicable to this type of proposed action.

### 3. **SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS) ?**

Based on the following considerations, I find that an EIS does not need to be prepared:

- The EA adequately addresses the issues identified during project development and displays the information needed to make the decisions.
- Evaluation of the potential impacts of the proposed North Fork by Two Timber Sale Project indicates that no significant impacts would occur.
- The ID Team provided adequate opportunities for public review and comment. Public concerns were incorporated into the project design and analysis of impacts.

Brian Manning  
Unit Manager  
Stillwater State Forest  
March 31, 2008

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# **NORTH FORK BY TWO PROPOSED TIMBER SALE PROJECT**

## **CHAPTER I PURPOSE AND NEED**

### **INTRODUCTION TO PROPOSED ACTION**

The Department of Natural Resources and Conservation (DNRC), Stillwater Unit, is proposing the North Fork by Two Timber Sale Project. The proposed action is to harvest timber and acquire easements to the harvest areas. The proposed timber harvest is located in Section 16, T37N, R22W (the Mud Lake Section is located approximately 16 miles northwest of Polebridge), and Section 36, T36N, R22W (the Moose Creek Section is located approximately 6 miles northwest of Polebridge). The gross sale area encompasses 1,280 acres of State Common School trust lands in Flathead County (see *VICINITY MAP* inside the front cover). The easements DNRC proposes to acquire are within the North Fork Flathead River drainage and are displayed in *CHAPTER II, FIGURE II-1 - ROAD EASEMENT MAP* and *TABLE II-2 - DNRC EASEMENT AND RIGHT-OF-WAY REQUESTS*.

Two alternatives, an action and a no-action alternative, are proposed. If the action alternative to harvest timber is selected, an estimated 2 to 3 million board feet (MMbf) of timber would be harvested from approximately 580 acres using a variety of silvicultural treatments (refer to *CHAPTER II - ALTERNATIVES* for maps and descriptions of silvicultural treatments). The type of treatment selected for each stand would depend on the existing condition and the desired future condition for that particular stand. Along with existing roads, 0.25 miles of new road and less than 1.0 mile of short spur road would access the proposed harvest units. The spur roads would be built to minimum standards and reclaimed after

harvesting activities have been completed.

If the action alternative is selected, DNRC would proceed with the acquisition of a cost-share easement with the U.S. Forest Service (USFS). Access to the north side of the Moose Creek Section (Section 36) is through private property and 30 feet of USFS-managed land; the ultimate objective of DNRC is to obtain a permanent easement, although at the time of project implementation, a temporary road use agreement may be the avenue to harvesting the timber.

### **PURPOSE OF PROPOSED ACTION**

The lands involved in the proposed project are held in trust by the State of Montana for the support of specific beneficiary institutions, such as public schools, State colleges and universities, and other specific State institutions, such as the School for the Deaf and Blind (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11*). The Board of Land Commissioners (Land Board) and DNRC are legally required to administer these trust lands to produce the largest measure of reasonable and legitimate long-term return for these beneficiary institutions (*Section 77-1-202, Montana Codes Annotated [MCA]*).

On May 30, 1996, DNRC released the Record of Decision on the *State Forest Land Management Plan (SFLMP)*. The Land Board approved the SFLMP's implementation on June 17, 1996. On March 13, 2003, the Department adopted the *Forest Management Rules (Administrative Rules of Montana [ARM] 36.11.401 through 450)*. The SFLMP outlines the management

philosophy, and the proposal will be implemented according to the Forest Management Rules. The philosophy is:

*"Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream... In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives."*

## **OBJECTIVES OF PROPOSAL**

DNRC has set the following specific project objectives to meet the SFLMP and Forest Management Rules:

- Harvest 2 to 3 MMbf of sawtimber to generate revenue for the Common School trust and contribute a sufficient amount of sawlog volume to meet the requirements of sustained yield for the DNRC timber-management program, as mandated by *State Statute 77-5-222, MCA*.
  - Improve the long-term productivity of timber stands by increasing stand vigor, reducing the incidence of insect infestations and disease infections, and regenerating portions of the stands where growth is declining. Silviculture prescriptions would be designed to maintain site productivity and favor the retention and regeneration of appropriate species mixes (desired future conditions [ARM 36.11.405]).
  - Reduce the potential of wildfires along the North Fork Road and in stands adjacent to private ownership and residences by reducing forest fuel loadings.
  - Secure permanent access into State lands through cost-share
- agreements with USFS and adjacent private landowners.
  - Minimize the visual impacts of timber harvesting and road building on State lands in the project area.
  - Reduce the spread of noxious weeds with a monitoring and treatment program.

## **ENVIRONMENTAL ASSESSMENT (EA) PROCESS**

### **EA DEVELOPMENT**

This EA was prepared in compliance with the *Montana Environmental Policy Act (MEPA)* of 1971. The intent of MEPA is to foster better decisions and wise actions by ensuring that relevant environmental information is available to the public officials and citizens before decisions are made and actions are taken. MEPA requires the State government to consider environmental impacts in its decisionmaking process.

### **PUBLIC SCOPING**

The public scoping process begins during the initial stage of an EA and is used to inform the public that a State agency is proposing an action. The public is invited to identify issues of concern and suggest alternatives to the proposed action.

In February 2007, DNRC solicited public participation in the North Fork by Two Timber Sale Project by advertising in the Hungry Horse News weekly newspaper and sending an initial proposal to neighboring landowners.

An Initial Proposal, which described the proposed action, was mailed to individuals, agencies, industry representatives, and other organizations that have expressed interest in Stillwater State Forest's management activities.

The comment period for the Initial Proposal was 30 days. Received were

15 letters, 4 phone calls, and 8 e-mails. The concerns identified through the public scoping were summarized and used to further refine the project.

#### ***INTERDISCIPLINARY TEAM (ID TEAM)***

The ID Team is made up of wildlife and fisheries biologists, a hydrologist, and several foresters. Beginning in the summer of 2006, the ID Team began to compile issues and gather information related to existing environmental conditions. Comments received from the public and other agencies were utilized in developing the timber sale project and resolving access issues. These concerns were also considered when the ID Team discussed alternative development. Based on input, the ID Team and decisionmaker made the decision to analyze the effects of an action and a no-action alternative.

The issues and concerns identified through the scoping process are summarized at the end of this chapter. The original comments and project mailing list are located in the project file at the Stillwater State Forest office in Olney.

#### ***DECISIONS TO BE MADE***

The following decisions are to be made as a result of this EA and will be incorporated into the Finding.

- Do the alternatives presented meet the objectives?
- Does the selected alternative have significant effects on the human environment?
- Should an Environmental Impact Statement (EIS) be prepared?

#### ***PROPOSED SCHEDULE OF ACTIVITIES***

If the action alternative were selected, a Timber Sale Contract would likely be prepared in the fall of 2007.

The contract package would, tentatively, be scheduled for

presentation to the Land Board in the spring of 2008. If the Land Board approves the package, the timber sale would be advertised for bid. Harvesting and roadwork under the contract package would occur over a 3-year period. Postharvest activities, such as site preparation, planting, and hazard reduction, would take place following the harvesting activities.

#### ***OTHER AGENCIES WITH JURISDICTION/ PERMIT REQUIREMENTS***

##### ***MONTANA/IDAHO AIRSHED GROUP***

DNRC is a member of the Montana/Idaho Airshed Group, which regulates slash burning done by DNRC. DNRC receives an air-quality permit through participation in the Montana Airshed Group.

##### ***USFS***

Commercial log hauling on USFS roads requires a Temporary Road Use Permit from Glacier View Ranger District, Flathead National Forest (FNF).

#### ***OTHER ENVIRONMENTAL REVIEWS RELATED TO THE PROJECT***

Information from relevant past, present, and reasonably foreseeable future actions were used to analyze the cumulative effects of the proposed action.

DNRC timber sales considered in this EA include Duck-to-Dog Timber Sale Project EA (2007), Shorts Meadow/Evers Creek Timber Sale Project EA (2007), and the draft analyses for the Chicken-Antice Timber Sale Project EA.

USFS projects considered in analyses of this project include the Red Whale Environmental Impact Statement and Trail Fuels Reduction Project Decision Memo.

## ISSUES AND CONCERNS

Throughout the scoping process, the public and resource specialists of DNRC and other agencies raised concerns about the project's potential impacts on the environment. These concerns were considered by DNRC during the

development of the project alternatives (see *CHAPTER II - ALTERNATIVES*). A summary of the issues addressed in this EA are presented by resource in *TABLE I-1 - SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC AND INTERNAL COMMENTS*.

**TABLE I-1 - SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC AND INTERNAL COMMENTS**

RESOURCE AREA	CONCERN OR ISSUE	WHERE ADDRESSED IN THE EA
Vegetation	Concern was expressed over the type of silvicultural treatment proposed: seedtree, commercial thin, selection cut.	Pages II-1 through II-3 and II-5 through II-9
	Method of logging, timing of harvest, and duration allowed for harvesting were concerns.	
	Concern was expressed over postharvest treatment and reclamation.	Pages II-1 through II-3, II-7 through II-9, and III-2 through III-9
	Achieving the desired tree species for regeneration was a concern.	Pages II-1 through II-3, II-5 through II-9, and III-2 through III-9
	The effects of logging and road construction spreading noxious weeds were a concern.	Pages III-9 through III-10 and Appendix B - Stipulations and Specifications
Roads	Concern was expressed on Moose Creek Road related to: <ul style="list-style-type: none"> <li>- dust,</li> <li>- increased traffic,</li> <li>- haul timing and duration, and</li> <li>- noise,</li> <li>- more parking areas,</li> <li>- length of time needed to secure permanent access, and</li> <li>- number and size of culverts and to what extent they would be constructed.</li> </ul>	Pages II-3 through II-5 and Appendix B - Stipulations and Specifications
Hydrology	Concern was expressed over the hydrologic effects of logging on the Moose Creek Section, Mud Lake Section, and parcel north of Home Ranch.	Pages II-14, II-15, and III-20 through III-25

RESOURCE AREA	CONCERN OR ISSUE	WHERE ADDRESSED IN THE EA
Hydrology (continued)	The primary parameter of concern for water quality is sediment. Increased sediment delivery and deposition can affect physical and biological water quality, channel stability, and geomorphology. Timber harvesting and associated road construction can increase sediment yield through exposure of bare soil.	Pages II-14, II-15, and III-20 through III-25
	Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed.	Pages II-14, II-15, and III-20 through III-25
Fisheries	The proposed actions may adversely affect fisheries populations and fisheries habitat features, including channel forms, stream temperature, and connectivity.	Pages II-15 and III-26 through III-33
Wildlife	Concern was expressed that timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely upon these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and/or successfully reproduce.	Pages II-16 thru II-21, and III-38 through III-62
	Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependant upon these resources, which could alter their survival and/or reproductive ability.	Pages II-17 and III-42 through III-44
	Concern was expressed that timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.	Pages II-18 and III-44 through III-48
	Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.	Pages II-19 and III-48 through III-50

RESOURCE AREA	CONCERN OR ISSUE	WHERE ADDRESSED IN THE EA
Wildlife (continued)	Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.	Pages II-20, III-42 through III-44, and III-56 through III-58
	Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest, and/or could displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.	Pages II-20 and III-58 through III-60
	Concern was expressed that timber harvesting and associated activities could remove elk security habitat and increase elk vulnerability.	Pages II-21 and III-60 through III-62
Soils	Action related to the proposed timber sale may lead to compaction, displacement, and/or erosion.	Pages II-14 and III-10 through III-17
Economics	State lands are managed to provide revenue to State beneficiaries over time. The proposed action would generate revenue for common schools.  The economic analysis is one criteria used by the decisionmaker as guidance to formulate a decision.	Pages III-34 through III-36
Air quality	Log hauling on dirt and gravel roads during dry periods of the year can increase the amount of dust particulates along the roadway.	Dismissed (refer to Stipulations and Specifications)

## ISSUES DROPPED FROM FURTHER CONSIDERATION

### ***SENSITIVE PLANTS***

In June 2007, Stillwater Unit contracted a botanist to survey the Wiggle Road area in Section 11, T34N, R21W; the Moose Creek area in Section 36, T36N, R22W; and the Mud Lake area in Section 16, T37N, R22W. The primary purpose of the survey was to find and document plant species of concern as ranked by the Montana Natural Heritage Program (MNHP). The botanist observed no sensitive plant species and concluded that the Mud Lake/Moose Creek wetland complexes had

been influenced by beavers and should not be classified as an area of unique wetland plant communities.

Additionally, the North Fork by Two Timber Sale Project activities will not take place in or immediately adjacent to these wetlands; therefore, the wetland complexes are outside the scope of this project.

The botanist completed and submitted to MNHP a *PLANT SPECIES OF SPECIAL CONCERN SURVEY FORM* to update their records. The completed forms are in the project files at the Stillwater Unit office (*personal communication, J. Pierce*).

**ARCHAEOLOGY**

The project area has been inspected for cultural resources by DNRC archaeologists; therefore, further investigation is not deemed necessary. A contract clause provides for suspended operations if cultural resources were discovered; operations may only resume as directed by the forest officer (see APPENDIX B — STIPULATIONS AND SPECIFICATONS).

**HYDROLOGY AND SOILS (HOME RANCH PARCEL)**

Impacts to hydrology and soils in the Home Ranch parcel have been dropped from further consideration because the area is no longer within the proposed action area.

# **NORTH FORK BY TWO PROPOSED TIMBER SALE PROJECT**

## **CHAPTER II ALTERNATIVES**

### **INTRODUCTION**

This chapter includes a description of how the Action Alternative was developed, describes the No-Action and Action alternatives for the North Fork by Two Timber Sale Project, and summarizes the predicted effects of implementing each alternative. *TABLE II-2 - SUMMARY OF THE ENVIRONMENTAL EFFECTS* summarizes predicted effects from the detailed environmental analysis in *CHAPTER III - EXISTING CONDITIONS AND ENVIRONMENTAL EFFECTS*.

### **DEVELOPMENT OF ALTERNATIVES**

The North Fork by Two Timber Sale Project area was initially listed on the Northwestern Land Office (NWLO) 2003 List of Upcoming Timber Sales. The project area was identified for timber harvesting primarily because of the need to reduce the fuel loads and stocking densities in timber stands on State lands in the vicinity of private residences in the North Fork Flathead River drainage. DNRC's management of these lands uses timber harvesting to promote biodiversity and also contribute to meet the requirements of sustained yield for DNRC timber-management programs as mandated by *State Statute 77-5-222, MCA*.

Throughout 2005, 2006, and 2007, ID Team members and other DNRC personnel were involved in analyzing data in the Stand Level Inventory (SLI) database, field reconnaissance, and data collection in the project area. Information was collected on:

- existing roads to determine needs to improve surface drainage, ditch-relief stream crossings, and safety features;

- road access needs, including assessing feasible road locations and designs;
- timber-stand characteristics, noxious weeds, and sensitive plants;
- insect and disease problems;
- specific and general watershed characteristics; and
- the presence of fisheries and various wildlife habitats.

Field data was used in defining the project and analyzing the alternatives or options and their potential effects. Using this information and public comment from the project's public scoping within the framework of the SFLMP and Forest Management Rules, one action alternative was developed. The ID Team felt the issues and concerns did not drive further alternative development.

Opportunities for harvesting timber are identified based on current and desired timber-stand conditions. Proposed treatments were developed that would, in the long-term, move timber-stand conditions toward desired age classes, species compositions, structures, and stocking densities. Proposed treatments would also maintain long-term site productivity, thereby ensuring the long-term capability of trust lands to produce revenue for the trust.

Stands were prioritized for treatment based on down wood and fuel loadings, stocking densities, and covertypes.

- The amount of fuel on the ground is due to mountain pine beetle activity in the late 1970s and early 1980s. This has resulted in



heavy fuel loading and has created areas that are at high risk for high-intensity, stand-replacement wildfires.

- Stocking densities have become dense, which have reduced live crown ratios and, over time, made the stand less productive. These areas would benefit in vigor and productivity by reducing competition for light, moisture, and nutrients.
- Over time and in part due to the pine beetle epidemic, the covertypes in some areas have changed from lodgepole pine and western larch to a mix of shade-tolerant species, such as Engelmann spruce and subalpine fir. The removal of lodgepole pine would result in an understocked condition or contain primarily shade-tolerant species of low vigor in some areas. These areas would be harvested to regenerate lodgepole pine, western larch, western white pine, and ponderosa pine.

#### **MODIFICATIONS TO INITIAL PROPOSAL**

The Initial Proposal considered harvesting in the section of DNRC-managed land just north of the Home Ranch area. This northern portion of Section 11, T34N, R21W, was removed from the Action Alternative because the need for harvesting was minimal and would likely be marginally economical when the costs of hazard reduction and road reconstruction were included. The southern portion of this section was salvage harvested in the winter of 2007 when many Engelmann spruce trees infested and killed by spruce bark beetles were removed. Surveys throughout the summer of 2007 showed few areas of beetle activity still present. This area will continue to be monitored for beetle activity.

The eastern portion of the Mud Lake Section, including the timbered area around the beaver-pond complex, was also initially proposed for

harvesting. This area was dropped from this proposal. The rationale for dropping this area from the harvest proposal came from discussions about open-road densities as they relate to wildlife habitat and the low value of the available timber. The reconstruction needs on the existing road into this portion of the project area, the minor amount of the available timber, snow depths, and haul distances would lower the economic return to the trusts.

#### **ALTERNATIVE DESCRIPTIONS**

The No-Action and Action alternatives are described in this section. The decisionmaker may select a modification or combination of the alternatives.

- ***No-Action Alternative***

Under the No-Action Alternative, no timber harvesting, improvements to existing roads, acquisition of permanent access on lands described in *TABLE II-1 - DNRC EASEMENT AND RIGHT-OF-WAY REQUEST* and shown on *FIGURE II-1 - ROAD EASEMENT MAP*, or revenue generation for the appropriate school trusts would take place in the area of the North Fork by Two Timber Sale Project at this time. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and other ongoing management requests may occur. Nonpoint source sediment delivery (sediment that cannot be traced back to a single origin or source) from roads not fully meeting BMPs may occur. Natural events, such as plant succession, tree mortality due to insect infestations and disease infections, windthrow, down fuel accumulation, an in-growth of ladder fuels, and wildfires, would continue to occur. Future proposed management activities, including timber harvesting, would

go through the appropriate environmental analyses before implementation.

The No-Action Alternative can be used as a baseline for comparing the effects that the Action Alternative would have on the environment. The No-Action Alternative is considered a possible alternative for selection.

- ***Action Alternative***

The ID Team developed strategies for harvesting timber within the framework of the SFLMP and the Forest Management Rules. Opportunities for harvesting timber are identified based on current and desired timber-stand conditions. Proposed treatments were developed that would, in the long-term, move timber-stand conditions toward desired age classes, species compositions, structures, and stocking densities. Proposed treatments would also maintain long-term site productivity, thereby ensuring the long-term capability of trust

lands to produce revenue for the trust.

The following sections describe roads, the road-access portion of the timber sale project proposal, and the objectives and prescriptions of the timber harvest. Proposed cost-share roads, existing roads, and unit locations are shown in *FIGURE II-1 - ROAD EASEMENT MAP*, *FIGURE II-2 - MOOSE CREEK HARVEST MAP*, AND *FIGURE II-3 - MUD LAKE HARVEST MAP*

#### **Roads and Access**

DNRC has identified several roads with no State easements within the North Fork drainage. Easement on several of these existing roads is available through the Federal Road Cost-Share Program; one other road system DNRC would seek legal access through is across several private landowners, as well as USFS. *TABLE II-1 - DNRC EASEMENT AND RIGHT-OF-WAY REQUESTS* AND *FIGURE II-1 - ROAD EASEMENT MAP* display the location of the access roads, the type of easement, and some general information related to the easement and access.

**TABLE II-1 - DNRC EASEMENT AND RIGHT-OF-WAY REQUESTS**

<b>PRIMARY AREAS BEING ACCESSED</b>	<b>TYPE OF EASEMENT</b>	<b>LEGAL LOCATIONS OF ACCESS ROADS</b>	<b>ROAD NUMBER/MILES OF EASEMENT</b>	<b>ACRES BEING ACCESSED</b>
Section 16, T36N, R22W (Hornet-Whale)	Federal Cost- Share	Sections 14, 15, 16, 21, 22, 23, 24, T36N, R22W,	USFS 318, 70701, and 9805/3.6 miles	640
Section 36, T36N, R22W (Moose Creek)	Federal Cost- Share	Section 6, T35N, R21W; Section 1, T35N, R22W,	USFS 210C/ 1.33 miles	149
Section 36, T36N, R22W (Moose Creek)	Private and USFS easement	Section 30, T36N, R21W; Section 25, T36N, R22W	Private road/ 0.6 mile	451
Sections 3, 10, 11, T34N, R21W (Moran South)	Federal Cost- Share	Section 2, T34N, R21W	USFS 70725/ 0.2 mile	392
Section 30, T34N, R20W; Sections 24 and 25, T34N, R21W (Coal Banks)	Federal Cost- Share	Section 20, T34N, R20W,	USFS 10917 and 10920/ 0.7 miles	794

FIGURE II-1 - ROAD EASEMENT MAP



Surveys of existing roads have been conducted in the North Fork by Two Timber Sale Project area to identify erosion and surface-drainage problems that could be improved to prevent sediment delivery to streams. In the proposed timber sale project area where log hauling would occur, sediment-delivery reduction and the implementation of BMPs would be accomplished through a road-development package. Log hauling would be limited to periods when the road can support loaded log trucks. Improvements would include installation of road and ditch drainage features, grass seeding, and an initial and final grading of road surfaces. Dust abatement may be required when log hauling occurs under dry conditions.

Access into the north side of the Moose Creek Section may be achieved by obtaining easements through private property and USFS to an existing spur road along the north section line. From here, approximately 0.25 mile of new road and 0.75 miles of temporary road would be needed to access proposed Units 2A and 2B.

The right-of-way associated with the main access road to the south side of the Moose Creek Section is owned by USFS. The Cost-Share Agreement would give DNRC access to the south end of the Moose Creek Section. Road 210C begins at its junction with the North Fork Road in Section 6, T35, R21. Under the Federal Road Cost-Share Program, DNRC proposes to acquire easements and perform its share of maintenance on USFS Road 210C. From Moose Creek Road along the south section line, 2 short temporary spur roads (each less than 500 feet) would be constructed to access this proposed Unit 1; these roads would be closed following the treatment of logging slash.

In the Mud Lake Section, approximately 0.4 miles of existing road and 3 to 4 short temporary spur roads may be required to keep logging activities off the North Fork Road. All temporary roads would be reclaimed to reduce road maintenance costs and prevent motorized use after harvesting activities have been completed.

#### **Timber Harvesting Objectives and Prescriptions**

Under the Action Alternative, harvesting in the timber sale project area would occur primarily in:

- Areas with a high potential of man-caused ignitions, which include areas along the North Fork and Moose Creek roads and stands situated adjacent to private ownership.
- Areas where western larch, Douglas-fir, and Engelmann spruce are underrepresented in the species composition of the stand. The removal of lodgepole pine would open the site for favoring the retention and regeneration of an appropriate species mix that includes the species above, as well as create conditions favorable for planting ponderosa pine and western white pine on the appropriate sites.
- Areas where the health and vigor of forest stands would be improved by reducing the stand density through thinning; favoring western larch, Douglas-fir, and Engelmann spruce for retention; and salvaging trees attacked by insects and diseases.

Under this alternative, approximately 2 to 3 MMbf would be harvested from an estimated 580 acres using ground-based logging equipment.

The Action Alternative would require several harvest treatments (silvicultural prescriptions) to



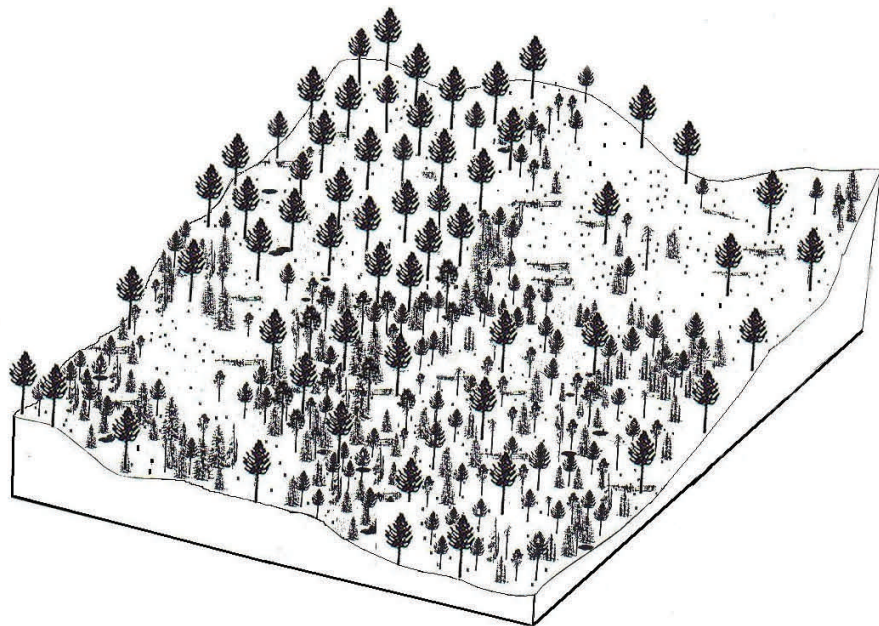
meet the desired management objectives. Multiple silvicultural prescriptions are proposed for implementation within a single harvest area of the Moose Creek Section. A variety of silvicultural prescriptions within a proposed harvest area would emulate the effects of mixed-severity fires across the landscape. As conditions allow, multistoried forest structures would be retained to perpetuate structural diversity.

The areas described as 'low retention' in *FIGURE II-2 - MOOSE CREEK HARVEST MAP* would mostly employ seedtree and overstory removal treatments. In the areas displayed as 'high retention', the irregular shelterwood and commercial-thin treatments would be used. *FIGURES II-2* and *II-3* display the expected variability the prescriptions will have across the landscape.



*FIGURE II-2 - An aerial photograph that displays a postharvest condition of a timber stand similar to the area in Moose Creek that demonstrates the low and high retention areas.*

*FIGURE II-3 - A visual representation of how these treatments may appear following harvesting. The visualizations are only a qualitative approximation of what would be expected to occur on the ground due to the variations and diversification of the stands treated in this project area.*



### ***PRESCRIPTION TREATMENTS***

- Seedtree - This treatment would regenerate portions of the unit by cutting all merchantable timber with the exception of 6 to 10 of the larger-diameter western larch and Douglas-fir per acre. The selected leave trees would show the most vigor, contain the healthiest crowns, and have the potential to produce healthy cone crops. Following machine scarification and the piling of logging slash, lodgepole pine and western larch would be expected to regenerate naturally in these openings. Western white pine and ponderosa pine would be interplanted in appropriate sites.
- Overstory Removal - Portions of the Moose Creek Section would be harvested with this treatment, which would consist of the removal of most of the merchantable overstory except for those trees needed as live recruitment trees for wildlife. These areas have healthy understories, which would provide a sufficient number of trees for the future.
- Irregular Shelterwood - The Moose Creek units would also receive an irregular shelterwood treatment. Trees retained with this treatment would be the larger-diameter western larch, ponderosa pine, and Douglas-fir, similar to the seedtree method, with the addition of younger and smaller trees that have grown slowly in the past, but are capable of rapid growth if released. Between 20 and 40 larger trees per acre would be retained in an irregular spacing, an existing understory of saplings and pole-sized trees would remain,

and understocked areas would be prepared for new seedlings to regenerate, resulting in a multistoried forest structure. Machine scarification would be used to prepare a seedbed in these irregular openings.

- Commercial Thin - In a portion of the Moose Creek Section and all of the proposed harvest area of the Mud Lake Section, 40 to 60 percent of the trees would be harvested to reduce stocking density, improve growth rates and vigor of the remaining trees, and increase the amount of western larch representation in the stand. Those harvest units would retain 40 to 120 of the largest, healthiest trees per acre; western larch and Douglas-fir would be preferred for retention.

Hazard reduction for logging slash would meet the State Hazard Reduction Law. In addition, those areas within 1,000 feet of a residential structure would meet the *High Standard* specification under this law. For 100 feet around the unit boundary, entire trees, including the tops and branches, would be removed to the landing site. Within one year, the landing piles would be burned or, if market and interest exist, the piles would be ground as biomass fuels. Site preparation and slash reduction within the main body of the harvest units would also occur within 18 months of logging. Areas with higher concentrations of slash would be piled, and areas of lower slash concentrations would be trampled into the ground with machinery. These methods would reduce the risk of intense fires and help with fire-suppression efforts in the harvested areas.

Following site preparation and hazard reduction, the proposed

silvicultural treatments would leave approximately 8 to 15 tons of coarse woody debris (greater diameter than 3 inches) per acre in harvest units. One perspective on tonnage would be that a truckload is approximately 25 tons; therefore, one might envision one-half to one-fourth of a truckload of logs spread over a 210-foot by 210-foot area.

Limited harvesting would occur in some buffer areas adjacent to streams and wetlands; DNRC would ensure compliance with the Montana Streamside Management Zone (SMZ) law and Forest Management Rules. Equipment would not be allowed within SMZs.

All western larch snags greater than 12 inches and 2 large live snag recruits would be retained per acre where available in harvest units. Where snags are lacking, up to 4 large live trees would be retained.

Silvicultural treatments that would be applied to each harvest unit are specified in *TABLE II-2 - PROPOSED SILVICULTURAL TREATMENTS BY UNIT FOR THE ACTION ALTERNATIVE*.

## **MITIGATIONS**

The stipulations and specifications designed to protect resources during harvesting and road-improvement activities are forms of mitigation measures that would be applied to the Action Alternative (see *STIPULATIONS AND SPECIFICATIONS*). These stipulations and specifications are incorporated into the Timber Sale or Site-Preparation

contracts and are enforced during contract administration. Mitigation measures designed to reduce impacts on a particular resource are also discussed in *CHAPTER III - EXISTING ENVIRONMENT AND ENVIRONMENTAL EFFECTS*.

The following are a few notable mitigations that would be applied to the timber sale:

- 1) All applicable Forestry Best Management Practices (BMPs), including the SMZ Law and Rules, and Forest Management Administrative Rules for fisheries, soils, and wetland riparian management zones (ARMs 36.11.425 and 36.11.426) would be applied.
- 2) The SMZ Law and Rules would be applied to all non-fish-bearing streams and lakes.
- 3) All road-stream crossings would be monitored for sedimentation and deterioration of road prism.
- 4) Equipment traffic would only be allowed at road-stream crossings when road prisms have adequate load-bearing capacity.
- 5) All logging, site preparation, and slash reduction projects on the north side of Moose Creek would be completed within 2 years.
- 6) All temporary roads would be closed with earthen berms and slash; portions of these roads and trails may be accessible to foot traffic.
- 7) Most of the dead western larch greater than 12 inches dbh would be retained on the Moose Creek Section.

**TABLE II-2 - PROPOSED SILVICULTURAL TREATMENTS BY UNIT FOR THE ACTION ALTERNATIVE**

	UNIT 1	UNIT 2	UNIT 3
Acres	91	353	132
Treatment	60 percent commercial thin and irregular shelterwood, 40 percent seedtree and overstory removal.		Commercial thin
Yarding Method	Tractor		
Harvest Volume (Mbf)	350	1,400	350
Site Preparation and Hazard Reduction	Mechanically scarify areas planned for regeneration. Trample and pile concentrations of slash. Burn piles and landings.		Mechanically trample slash concentrations and burn landing piles.
Method of regeneration in areas being regenerated	Natural regeneration and interplanting on approximately 150 acres.		N/A
Note: Acres and Mbf may change based on continuing field work and unit layout.			



FIGURE II-2 - MOOSE CREEK HARVEST MAP

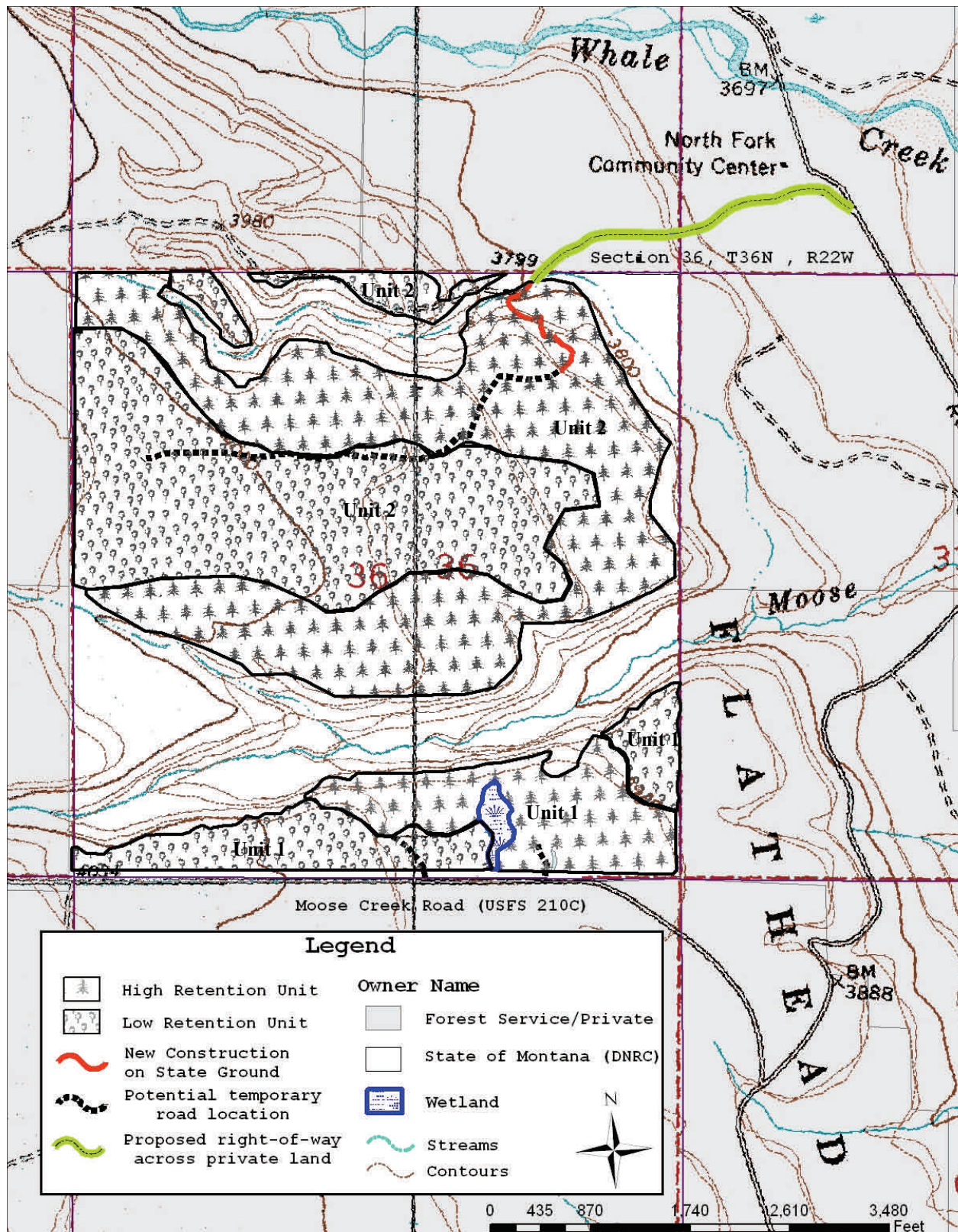
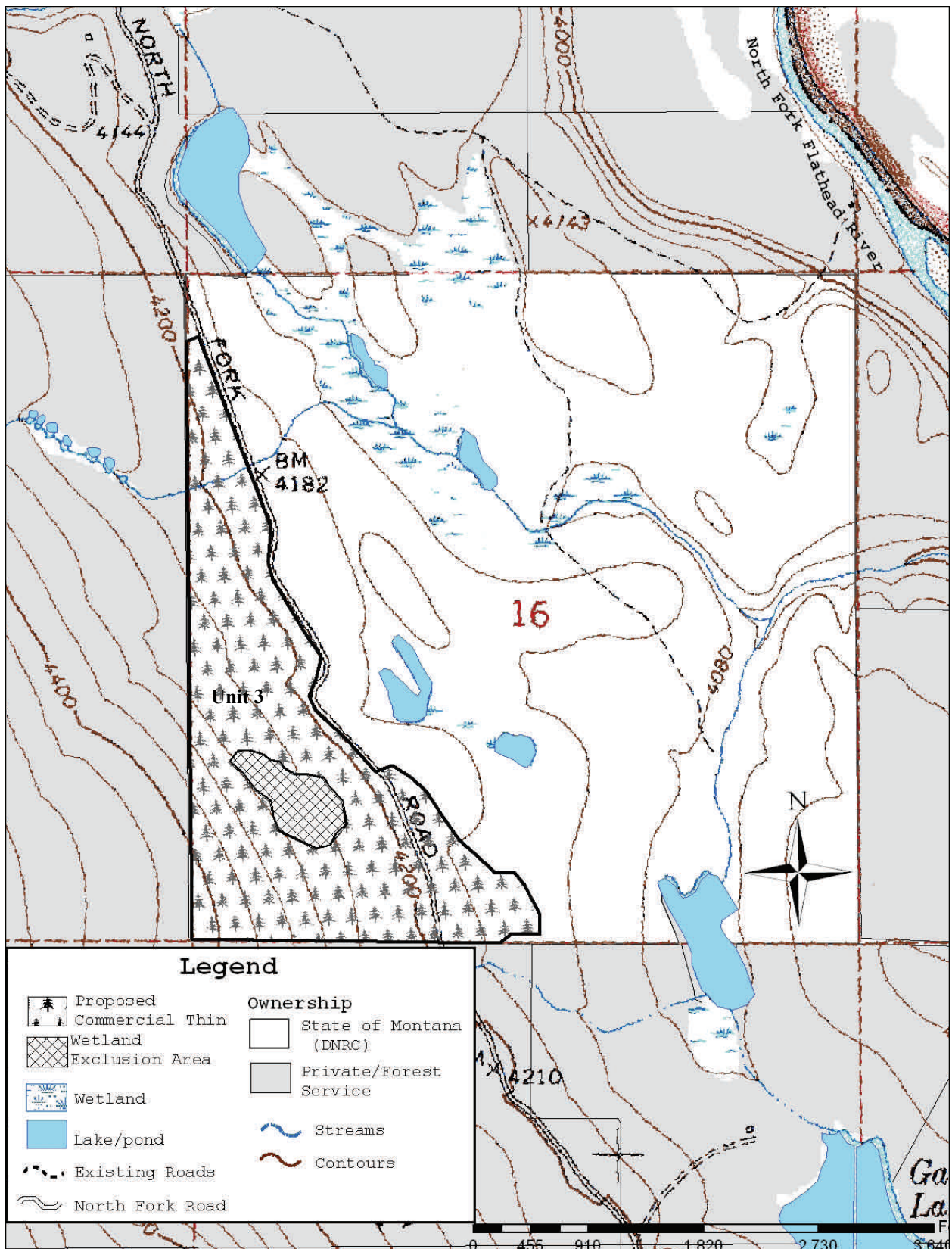




FIGURE II-3 - MUD LAKE HARVEST MAP



## SUMMARY OF ENVIRONMENTAL EFFECTS

The following table compares the direct, indirect, and cumulative effects between the Action and No-Action alternatives. For more detailed descriptions, see CHAPTER III - EXISTING ENVIRONMENT AND ENVIRONMENTAL CONDITIONS.

**TABLE II-1 SUMMARY OF ENVIRONMENTAL EFFECTS**

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>VEGETATION</b>		
Age class	<b><i>No-Action Alternative</i></b>	
	No changes would be expected.	Other forest-management actions on Stillwater State Forest would increase the amount of area in the 0-to-39-year age class by decreasing the percent of area from other age classes.
	<b><i>Action Alternative</i></b>	
	No changes would be expected based on DNRC's SLI methodologies used in determining age-class groups. Forest structure would be changed on approximately 234 acres.	Cumulative effects would be similar to the No-Action Alternative.
Covertypes	<b><i>No-Action Alternative</i></b>	
	No changes would be expected.	Other timber sale forest-management actions on Stillwater State Forest would increase the amount of western white pine and western larch/Douglas-fir covertypes by reducing mixed-conifer, subalpine fir, and lodgepole pine covertypes.
	<b><i>Action Alternative</i></b>	
	Approximately 25 acres of the lodgepole pine covertype would be converted to a western larch/Douglas-fir or mixed-conifer covertype.  Approximately 62 acres of the subalpine fir covertype would be converted to a western larch/Douglas-fir or mixed-conifer covertype.	Cumulative effects would be similar to the No-Action Alternative.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>VEGETATION</b>		
Insects and diseases	<b><i><del>No-Action</del> Alternative</i></b>	
	Mortality would likely continue causing additional loss in sawlog volume. Additionally, the accumulation of standing and down woody debris would continue.	Forest-management treatments on Stillwater State Forest promote regeneration and retain a diverse species mix of trees less susceptible to insect and disease attacks.
	<b><i>Action Alternative</i></b>	
	Mortality from insects and diseases would decrease and stands would be replaced with young vigorous trees of the desired species that tend to be less susceptible to the current insect and disease problems.	Cumulative effects would be similar to the No-Action Alternative.
Forest fuels	<b><i><del>No-Action</del> Alternative</i></b>	
	High levels of ladder fuels and down woody fuels and high amounts of trees per acre would remain. The risk of high-intensity wildfires would remain higher than in the Action Alternative.	The reduction of fuels through logging practices in adjacent stands has reduced the potential of high-intensity wildfires on Stillwater State Forest.
	<b><i>Action Alternative</i></b>	
	Ladder fuels would be removed in most harvest units, and the slash and fuel treatments would limit the intensity of fires within those areas harvested.	Past timber harvests, fuel treatment projects, and natural wildfires have created mosaics; these mosaics break up the continuity of fuels and reduce the potential of high-intensity wildfires.
Noxious weeds	<b><i><del>No-Action</del> Alternative</i></b>	
	The risk of new infestations would not increase.	If funding remains available, weed spraying would reduce the current weed populations. Monitoring weed populations would continue as DNRC personnel travel in the area.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>VEGETATION</b>		
Noxious weeds (continued)	<b><i>.Action .Alternative</i></b>	
	New infestations of noxious weeds and infestations of weeds not listed by Flathead County as noxious (such as woolly mullen) are likely to increase. Mitigation measures, such as weed spraying and equipment washing should reduce the potential for infestations within the forest.	If funding remains available, weed spraying would reduce current weed populations. As surveys and the administration of postharvest activities occur within the project areas, the monitoring of weed populations would continue.
<b>SOILS</b>		
Soil physical properties and slope stability	<b><i>.No-Action .Alternative</i></b>	
	No direct or indirect effects would occur to the physical properties of the soil or slope stability.	No additional impacts to the physical properties of soil would occur, and existing impacts would improve or degrade as dictated by natural or preexisting conditions.
	<b><i>.Action .Alternative</i></b>	
	Approximately 46 acres would be affected from harvesting and road construction in the Moose Creek Section and up to 10 acres would be affected in the Mud Lake Section. No adverse effect to slope stability is anticipated.	Cumulative impacts would be similar to the direct and indirect effects. Overall, less than 15 percent of the proposed harvest areas would display effects to the physical properties of the soil.
<b>HYDROLOGY</b>		
Water quality and water yield	<b><i>.No-Action .Alternative</i></b>	
	Water quality and water yield would be unaffected, and the streams would continue to be affected by natural and preexisting conditions.	Water quality and water yield would be unaffected, and the streams would continue to be affected by natural and preexisting conditions.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>HYDROLOGY</b>		
Water quality and water yield (continued)	<b><i>.Action .Alternative</i></b>	
	No impacts to water quality are expected from timber harvesting and roadwork. Water yield may increase up to 2 percent in the Moose Creek Section. No measurable increase in water yield are expected in the Mud Lake Section. No changes in channel stability are expected in either section.	Adverse cumulative effects to water quality are not expected in either section. An elevated, but very small risk of increasing sediment loads would occur until the disturbed areas revegetate.  Adverse cumulative impacts are not expected in the Moose Creek watershed or within, as well as below, the Mud Lake Section. This is in part due to the limited area of the harvest, the selective nature of the treatments, and the high stability of the stream channels.
<b>FISHERIES</b>		
Fisheries populations and habitats	<b><i><del>No</del>.Action .Alternative</i></b>	
	No effects are expected to fisheries resources in the Mud Lake or Moose Creek sections.	No cumulative effects to fisheries resources in the Mud Lake area are expected.  Future related actions in the Moose Creek watershed that are considered part of cumulative effects would have a low risk of very low cumulative impacts to that fisheries resource.
	<b><i>.Action .Alternative</i></b>	
	No effects are expected to fisheries resources in the Mud Lake Section.  No impacts to native bull trout, westslope cutthroat trout, or sculpin presence or distribution in Moose Creek are expected. Considering sediment, flow regime, and large woody debris recruitment, a low risk of very low impacts to channel forms is expected. A low risk of very low impacts to stream temperature is expected. No proposed actions would affect fisheries connectivity.	No cumulative effects to fisheries resources in the Mud Lake area are expected.  In the Moose Creek analysis area, an overall low risk of very low cumulative impacts to native fisheries are expected due to the low risk of very low impacts to channel forms and stream temperature, and no impacts on connectivity are expected.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>ECONOMICS</b>		
	<b><i>No-Action Alternative</i></b>	
	Revenue for the trust would not be realized at this time.  Access rights would not change, and the value of this DNRC-managed State land would remain similar to current conditions.	The deferral of harvesting may change the region where trees are harvested and volumes are taken, which would impact other areas of the State.
	<b><i>Action Alternative</i></b>	
	An estimated 2.5 MMbf would be harvested to meet DNRC's annual sustained-yield target of 53.2 MMbf. Approximately \$393,234 would be deposited into the Common Schools trust; approximately \$68,250 would be deposited into the FI account.	This timber sale would be part of DNRC's State-wide sustained-yield annual harvest of timber from State trust lands. The net revenue of this sale would add to the Common Schools trust fund.
<b>WILDLIFE</b>		
Forested habitats and connectivity	<b><i>No-Action Alternative</i></b>	
	No changes in wildlife use would be expected. Forest conditions would continue to age and move toward shade-tolerant tree species with high amounts of canopy cover.	Continued use by wildlife species favoring dense stands of shade-tolerant tree species and those requiring larger areas of mature forests would be expected.
	<b><i>Action Alternative</i></b>	
	Proposed treatments would lead to younger, more-open stands, which could disrupt movements by some species requiring extensive, connected forested habitats; however, connectivity would persist. Habitat conditions would improve for species adapted to the more-open forest conditions, while habitat quality for species that prefer dense, mature forest conditions would be reduced.	Reductions in mature forested habitats associated with this alternative would be additive to losses associated with past harvesting activities. Extensive forested habitats would still exist in the analysis area, and landscape connectivity would persist.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>WILDLIFE</b>		
Forested habitats and connectivity	<b><i>No-Action Alternative</i></b>	
	No changes in wildlife use would be expected. Forest conditions would continue to age and move toward shade-tolerant tree species with high amounts of canopy cover.	Continued use by species favoring dense stands of shade-tolerant tree species and those requiring larger areas of mature forests would be expected.
	<b><i>Action Alternative</i></b>	
	Proposed treatments would lead to younger, more-open stands, which could disrupt movements by some species requiring extensive, connected forested habitats; however, connectivity would persist. Habitat conditions would improve for species adapted to the more-open forest conditions, while habitat quality for species that prefer dense, mature forest conditions would be reduced.	Reductions in mature forested habitats associated with this alternative would be additive to losses associated with past harvesting activities. Extensive forested habitats would still exist in the analysis area and landscape connectivity would persist.
Snags and coarse woody debris	<b><i>No-Action Alternative</i></b>	
	No direct changes in deadwood resources would be expected. Snags would continue to provide wildlife habitats, and new snags would be recruited as trees die. Continued decay and decline in existing snags and trees would contribute to coarse woody debris in the area.	Snags and snag recruits have been retained with some past harvesting in the vicinity. Wildlife relying on snags and coarse woody debris would be expected to persist across the analysis area.
	<b><i>Action Alternative</i></b>	
	Present and future deadwood material could be reduced. Several snags and snag recruits would be retained within the proposed units. The quality of future snags would be enhanced.	The loss of snags and coarse woody debris associated with this alternative would be additive to losses from past harvesting and firewood gathering. Wildlife relying on snags and coarse woody debris would be expected to persist.



RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>WILDLIFE</b>		
<b>Threatened and Endangered Species</b>		
Grizzly bear	<b><i>No-Action Alternative</i></b>	
	No direct effects would be expected. No changes in road densities, hiding cover, or security core would be anticipated.	No further changes to motorized access, security and hiding cover, and spring habitat would be anticipated. Activities on private lands are expected to continue disturbing bears and altering habitat. In the long term, though forest succession would continue and may reduce food sources, the amount of hiding cover may increase.
	<b><i>Action Alternative</i></b>	
	Minor effects to grizzly bear disturbance levels, habitats, and security areas would be anticipated. Disturbance would increase with harvesting and associated human access. Grizzly bears could be affected directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. No permanent changes to open-road densities would occur. Habitat quality may be reduced, but harvesting activities would not take place during the spring period. Hiding cover would be reduced. The security core would not be entered.	Disturbance would be additive to ongoing activities on USFS and private ownerships. Open-road densities would temporarily increase for up to 2 consecutive years. No long-term changes are anticipated. Reductions in hiding cover would be additive to the reductions due to past timber harvesting, extensive wildfires, and human developments; however, considerable hiding cover exists. No changes to security core would be expected.
Gray wolf	<b><i>No-Action Alternative</i></b>	
	Disturbance to wolves would not increase. No changes in wolf prey availability would be expected.	No changes to wolf prey or habitat use would be anticipated. Changes in the level of human disturbance would be similar to the current condition.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>WILDLIFE</b>		
<b>Threatened and Endangered Species</b>		
Gray wolf (continued)	<b><i>.Action .Alternative</i></b>	
	Harvesting could disturb wolves using the area. After harvesting, wolf use of the project area would likely revert to preharvest levels. Shifts in prey availability could alter wolf use of the area.	Reductions in hiding cover within the project area could shift big game use; however, no appreciable changes within the analysis area would be anticipated. Disturbance levels would be expected to revert to current levels following harvesting and road closures.
Canada lynx	<b><i>.No .Action .Alternative</i></b>	
	Habitats would persist. Existing closed roads and skid trails would remain closed; no changes in levels of human disturbance would be expected.	Habitats would persist. Existing closed roads and skid trails would remain closed; no changes in levels of human disturbance would be expected.
	<b><i>.Action .Alternative</i></b>	
	Approximately 576 acres of lynx habitats would be harvested (mostly forested travel and denning); postharvest, these habitats would still contain some forested travel habitat and mostly revert to temporarily unsuitable habitat. Forest connectivity would largely be maintained through riparian buffers and other forested habitats in the project area. No appreciable changes to human access with recreational snowmobile use would be expected; therefore, no competition with lynx would be anticipated.	Approximately 576 acres of lynx habitats would be harvested (mostly forested travel and denning); postharvest, these habitats would still contain some forested travel habitat and mostly revert to temporarily unsuitable habitat. Forest connectivity would largely be maintained through riparian buffers and other forested habitats in the project area. No appreciable changes to human access with recreational snowmobile use would be expected; therefore, no competition with lynx would be anticipated.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>WILDLIFE</b>		
<b>Sensitive Species</b>		
Fisher	<b><i>No-Action Alternative</i></b>	
	Habitats that are conducive to fisher denning and travel may improve due to increased tree growth and canopy closure; however, foraging opportunities may decline. No changes to human disturbance and potential trapping mortality would be expected.	Suitable fisher foraging, denning, and resting habitats would remain over the analysis area. Landscape connectivity would remain largely intact. Road restrictions would remain the same; therefore, vulnerability to trapping would remain unchanged.
	<b><i>Action Alternative</i></b>	
	Approximately 4 of the 38 acres of riparian fisher habitat would be harvested, but would continue to provide habitat. Approximately 164 of the 324 acres of fisher foraging and resting habitats in the uplands would be harvested, yielding open-canopied stands and less likelihood of being foraging habitat.	Minor reductions in potential fisher habitats would be additive to the losses associated with past and ongoing harvesting in the area. Landscape connectivity would remain largely intact and human disturbance and potential trapping mortality would remain relatively unchanged.
Pileated woodpecker	<b><i>No-Action Alternative</i></b>	
	No direct effects would be anticipated with this alternative.	No further cumulative effects would be anticipated.
	<b><i>Action Alternative</i></b>	
	Some temporary displacement could occur. Nesting habitats are absent; therefore, no immediate changes would occur. A moderate level of effects would be anticipated to woodpecker habitats. Silvicultural treatments designed to recruit shade-intolerant tree species would benefit pileated woodpeckers in the distant future.	Minor cumulative effects to pileated woodpecker habitats and/or disturbance levels would be anticipated.

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
<b>BIG GAME</b>		
Elk security	<b><i>No-Action Alternative</i></b>	
	No changes in elk security cover would be expected; security habitat is absent. No changes in disturbance and potential mortality due to hunting would be expected.	Past harvesting, proposed fuels treatments, wildfires, and human developments have reduced elk security habitats while increasing human access. Over time, harvest areas and burned stands would likely provide additional hiding cover. Security habitat in the analysis area would largely persist, and ongoing reductions in hiding cover and habitats would continue.
	<b><i>Action Alternative</i></b>	
	No changes in elk security cover would be expected, and minimal changes in elk vulnerability or hunter access would be anticipated. Although mitigations within the harvest prescriptions would retain areas of cover, hiding cover would be reduced. Negligible effects are expected.	Negligible impacts to big game survival would be anticipated. No additional changes in elk security cover would be expected. Reductions in hiding cover would be additive to reductions elsewhere in the analysis area. Over time, harvest areas and burned stands would likely provide additional hiding cover.

# **NORTH FORK BY TWO PROPOSED TIMBER SALE PROJECT**

## **CHAPTER III EXISTING ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

### **INTRODUCTION**

This chapter presents both the existing environment of the project area and the potential consequences of the alternatives presented in *CHAPTER II - ALTERNATIVES*. Discussions of environmental consequences form the scientific and analytical basis for comparing the alternatives. The means by which potential adverse effects would be reduced or mitigated are also described (see *CHAPTER II* also). The proposed action alternative is limited to the specific timber harvest, fuel treatments, reforestation activities, and road maintenance in the North Fork by Two Timber Sale Project area, although some components are analyzed across the entire Stillwater State Forest landscape. The analysis of effects disclosed in this document includes those occurring from the entire "scope" of the decision. Scope is defined as the range of actions, alternatives, and impacts to be considered in an environmental review. The discussions of resources and potential effects take advantage of existing information

included in the SLI and other project documents. The project files for this timber sale project include all project-specific information, including resource reports and the results of field investigations.

### **DIRECT, INDIRECT, AND CUMULATIVE EFFECTS**

Direct effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the activity, but could be considerable in the foreseeable future. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions of other agencies that undertake such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

# VEGETATION ANALYSIS

## INTRODUCTION

This section describes the existing vegetation conditions of Stillwater State Forest as a whole and within the project area specifically, and how the No-Action and Action alternatives would affect the various components of this resource, including forest covertypes and age classes, insect and disease conditions, forest fuel conditions, and noxious weeds.

## BACKGROUND

The Forest Management Rules direct DNRC to take a coarse-filter approach to biodiversity by favoring an appropriate mix of stand structures and tree species composition; this appropriate mix is described as the desired future conditions on State land (DNRC 2003: ARM 36-11-404 and 36-11-405). To implement a coarse-filter approach and meet the directive, landscape-analysis techniques were used to determine the desired future conditions, including forest cotype representation, age-class distribution, and structural characteristics.

## ANALYSIS METHODS

The current stand conditions will be compared to stand conditions that DNRC considers as desired future conditions and appropriate for the site. The procedures used to assign covertypes on State forested lands are explained in detail in the Forest Management Rules (ARM 36.11.405).

To assess the existing condition of the project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, updated plot data, and consultations with other professionals provided information for the analysis. The existing condition and effects assessments

for insects, diseases, and forest fuels consider:

- forest covertypes,
- tree species and size classes,
- fire regimes, and
- risks associated with fire and further infestations or infections.

The Stillwater SLI, specifically *STW SLI\_2006*, was used to assign current covertypes. Areas displaying DNRC's desired future conditions have been delineated in the Forest Management Bureau's *Desired Future Condition DATASET* and are based on ecological characteristics found in SLI data, such as landtypes, climatic sections, habitat types, and disturbance regimes. This information is available at the Stillwater Unit office in Olney.

## ANALYSIS AREA

The coarse-filter analysis will consider historic conditions from climatic section 333c, which represents the Upper Flathead Valley (Losensky 1997). The current and desired future forest conditions will be analyzed on forested lands administered by Stillwater Unit. Stillwater Unit administers Stillwater State Forest, Coal Creek State Forest, and most of the scattered lands north of Coal Creek State Forest in Flathead County and the northeastern portion of Lincoln County. Direct and indirect effects will be discussed at the project level and over the coarse-filter analysis area. The cumulative-effects discussion will include the entire Stillwater Unit.

Condition assessments of insects, diseases, fuels, and noxious weeds were conducted on the 2 sections within the project area. Direct and indirect effects will be discussed at the project level. Cumulative effects will be discussed as they relate to Stillwater State Forest.

## VEGETATION ANALYSIS

### COVERTYPES AND AGE CLASSES

#### EXISTING CONDITION

Stands in these sections originated following large fires approximately 90 years ago. Around 1980, the larger-diameter lodgepole pine were infested with mountain pine beetles. Those trees eventually toppled, leaving a mixed-species stand of pole-sized lodgepole pine and western larch. Over the past 25 years, existing understory trees and regenerated seedlings, mostly Engelmann spruce and subalpine fir, took advantage of the openings in the canopy and now display high growth rates and vigor.

Covertypes refers to the dominant tree species that currently occupy a forested area. *TABLE III-1 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)* illustrates the current proportions of forest covertypes compared to desired future conditions, which are those covertypes that are appropriate for the site based on the ecological characteristics described above. The appropriate coertype

distribution is based on the current percent of species mix, fire and fire-suppression history, western white pine blister rust mortality, harvest history, and local site conditions.

Data indicates, as illustrated by *TABLE III-1 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)*, that mixed-conifer and subalpine fir stands are currently overrepresented compared to covertypes for Stillwater Unit. Many of the species that make up the mixed-conifer and subalpine covertypes are shade tolerant, and stand structure tends to be multistoried. The multistoried structure has resulted, in part, from the ingrowth of the shade-tolerant trees over time. Therefore, the component of shade-tolerant species increases as the interval between disturbances, such as wildfire or harvesting, is lengthened.

The western larch/Douglas-fir and western white pine covertypes are currently underrepresented on the forest compared to the appropriate

**TABLE III-1 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)**

COERTYPE	CURRENT (%)	DESIRED OR APPROPRIATE COERTYPE (%)
Douglas-fir	3.5	1.4
Subalpine fir	25.6	16.3
Lodgepole pine	10.7	9.9
Ponderosa pine	0.8	1.7
Mixed conifer	26.1	6.5
Western larch/Douglas-fir	24.5	47.4
Western white pine	2.6	14.8
Hardwoods	3.2	3.1
Area that does not have a coertype designated in the SLI*	4.3	
*A major portion of those stands not inventoried with a coertype are from stands that were involved in the stand-replacement fires of the Moose Fire of 2001; at the time of data collection, 2001 and 2002, these areas were nonstocked. Reconnaissance since the fire and salvage harvest shows that many areas are regenerating to the early successional covertypes of primarily lodgepole pine or western larch/Douglas-fir.		

## VEGETATION ANALYSIS

covertypes distribution. Western larch and western white pine are not shade tolerant and have, historically, been perpetuated through fairly intensive disturbances such as wildfires. These disturbances most often created single- and two-storied stands of primarily western larch and Douglas-fir overstories and western larch, western white pine, and Douglas-fir understories. While western larch is not shade tolerant, past silvicultural treatments have promoted multistoried western larch/Douglas-fir stands with numerous age classes represented in small groups of trees within larger stands. Additionally, white pine blister rust infection has drastically affected the western white pine coertype by substantially reducing over several decades the number of healthy western white pine that occupies the canopy as overstory dominants.

Age-class distributions delineate another characteristic important for determining trends on a landscape level. Comparing the entire Stillwater Unit's administrative area with historical data based on the *Upper Flathead Valley and Losensky (1997)*, *TABLE III-2 - DISTRIBUTION OF AGE CLASSES* shows that Stillwater Unit is low in the 0-to-39-year (seedling/sapling stands) and 100-to-150-year age classes, and high in the 40-to-99-year and greater-than-150-year age

classes. As recognized in forest management and by the Forest Management Rules, age-class distributions are not static and are quite dependant upon disturbances, whether those are natural or implemented by man through silvicultural practices.

A fairly clear picture emerges of the forest conditions when age class distributions are combined with information on coertypes as displayed in *TABLE III-3-AGE CLASS DISTRIBUTION OF CURRENT COERTYPES*.

As noted in *TABLE III-2 - DISTRIBUTION OF AGE CLASSES*, current age-class distributions are predominately in the oldest age class. The stand structure of these older age classes tends to be multistoried; this occurs when a stand has progressed through time and succession to the point that shade-tolerant species, such as grand fir, Engelmann spruce, and subalpine fir, are replacing a shade-intolerant overstory, such as western larch or lodgepole pine. Currently 94 percent of the area within the 150-year-plus age class is multistoried and the amount depicted in the mixed-conifer and subalpine fir coertypes is nearly 5 times higher than the desired future condition on Stillwater Unit.

**TABLE III-2 - DISTRIBUTION OF AGE CLASSES**

AGE CLASS	HISTORIC PERCENT IN CLIMATIC SECTION M333C	HISTORIC ESTIMATES OF PERCENT ON STILLWATER UNIT	CURRENT PERCENT
0-to-39-year	36	22.8	13.6
40-to-99-year	12	17.9	22.8
100-to-150-year	22	24.7	13.8
150+-year	29	32.8	45.8
No age provided in SLI*			3.9
*A major portion of these stands were partially burned in the Moose Fire of 2001; SLI updates in 2001 and 2002 could not discern which age class to assign these stands.			



## VEGETATION ANALYSIS

**TABLE III-3 - AGE-CLASS DISTRIBUTION OF CURRENT COVERTYPES**

CURRENT COVERTYPE	AGE CLASS					
	0 TO 39 YEARS	40 TO 99 YEARS	100 TO 149 YEARS	150 YEARS AND OLDER	NO AGE DATA	TOTAL ACRES
	NUMBER OF ACRES					
Douglas-fir	97	421	576	2,372	666	4,132
Hardwoods	118	123	69	64		373
Lodgepole pine	2,571	8,594	320	407		12,865
Mixed conifer	3,335	6,724	4,507	15,884	353	30,804
Ponderosa pine	170	0	525	192		886
Subalpine fir	3,946	6,525	4,116	16,823	304	30,154
Western larch/ Douglas-fir	404	4,269	5,816	16,121	2,242	28,853
Western white pine	360	198	325	2,140		3,024
Nonstocked	5,069					5,069
Total Acres (total %)	16,071 (13.6)	26,854 (22.8)	16,254 (13.8)	54,007 (45.8)	4,538 (3.9)	117,721

### **ALTERNATIVE EFFECTS TO COVERTYPES AND AGE CLASSES**

#### **Direct and Indirect Effects**

- ***Direct and Indirect Effects of the No-Action  
Alternative to Covertypes and Age Classes***

Neither covertypes nor age-class distributions in the analysis area would be directly or indirectly affected. Over time, lacking substantial disturbances such as timber harvests or wildfires, the proportion of seedling-/sapling-sized stands would gradually decrease.

- ***Direct and Indirect Effects of the Action  
Alternative to Covertypes and Age Classes***

In the area where treatment is proposed for the lodgepole pine coverteype, approximately 250 acres would be converted to either the mixed-conifer or western larch/Douglas-fir coverteype. In the area where treatment is proposed for the subalpine fir coverteype, approximately 62 acres would be converted to either the mixed-conifer or western larch/Douglas-

fir coverteype. Most of these treatments would result in two-storied stands comprised primarily of western larch, Douglas-fir, and Engelmann spruce, with trace amounts of ponderosa pine and western white pine in the overstory; after regeneration, the understory would be comprised of western larch, lodgepole pine, Engelmann spruce, western white pine, and Douglas-fir. Overall, the Action Alternative would move stands within the proposed project area toward desired future conditions.

Based on SLI methodologies, when the sawtimber component of a stand has greater than 10-percent canopy coverage, the stand will be evaluated and classified with the age class of that sawtimber component; therefore, not all areas of seedtree harvests would change to the 0-to-39-year age class. All of these stands that are receiving harvest treatments are multistoried stands and some would be converted to single- or

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two-storied stands. Therefore, although the age class would remain the same, 234 acres would undergo a change in structure. The overstory of the two-storied stands would consist primarily of western larch, Engelmann spruce, and Douglas-fir that are approximately 90 years old; a second story of western larch, lodgepole pine, Engelmann spruce, western white pine, and Douglas-fir would regenerate in 2 to 3 years. The created openings would be typical of mixed-severity fires. The proposed action would mimic the effects of historic fire behavior by creating openings for wildlife, reducing the potential of high intensity wildfires, and regenerating stands toward desired future conditions.

### Cumulative Effects

- ***Cumulative Effects of Both Alternatives to Covertypes and Age Classes***

The cumulative effects of timber-stand management on Stillwater State Forest trend toward increasing seral covertypes in areas where recent forest-management activities have taken place.

In addition to the changes in coertype distributions from the proposed alternative, many stands involved in the stand-replacement fires of the 2001 Moose Fire have not been inventoried. Other timber sale projects have been initiated, but have not been completed; therefore, their effects are not represented in the *STW 2006 SLI*. These projects would probably increase the amount of western larch/Douglas-fir coertype over the analysis area and, subsequently, reduce the amount of area in the mixed-conifer and subalpine fir covertypes. The Stillwater State Forest precommercial thinning program thins 200 to 500 acres of sapling stands a year. The

thinnings often favor the retention of western larch, western white pine, and, in some cases, Douglas-fir covertypes.

In addition to the changes in age-class distributions from the proposed alternative, other timber sale projects have been initiated, but have not been completed; therefore, their effects are not represented in the *STW 2006 SLI*. These projects are estimated to increase the amount of area in the 0-to-39-year age class by slightly decreasing the area in classes of older stands.

## INSECTS AND DISEASES

### EXISTING CONDITIONS

Insects and diseases are natural components of a healthy ecosystem. In most forest ecosystems, they are the major nutrient recyclers for soils and provide food and habitat for a variety of wildlife. Insects and diseases commonly cause mortality in large forested areas and can affect a number of resource values. Mountain pine beetle mortality in both the Moose Creek and Mud Lake sections increased in the late 1970s and early 1980s, resulting in heavy fuel loadings in those areas where lodgepole pine was a major component. Today only an occasional tree shows signs of active beetle attacks.

Armillaria root rot fungus is present in both sections and can be fatal to all species, but mature true firs and Douglas-fir are particularly susceptible. Loss of Douglas-fir is more noticeable in the Mud Lake Section; however, mortality is limited to occasional small pockets.

The timber sale project area is showing a high incidence of spruce broom rust (*Chrysomyxa arctostaphyli*) in the Engelmann spruce, especially in the Mud Lake Section. While this is usually not a fatal disease, growth loss may

## VEGETATION ANALYSIS

occur under conditions of severe infection and form is sometimes affected by large brooms.

In addition, white pine blister rust and spruce bark beetles are present.

Although this concern is not insect or disease related, a noticeable amount of bear damage is visible in the Engelmann spruce, lodgepole pine, and western larch saplings and poles.

### **ALTERNATIVE EFFECTS TO INSECTS AND DISEASES**

#### **Direct and Indirect Effects**

- ***Direct and Indirect Effects of the No-Action Alternative to Insects and Diseases***

Mortality from insects and diseases would likely continue and, in many cases, increase, causing loss of sawlog volume and value. Additionally, as mortality increases, the accumulation of standing and down woody debris would continue, increasing wildfire hazard.

- ***Direct and Indirect Effects of the Action Alternative to Insects and Diseases***

Mortality from some insects and diseases that are currently active in the project area would likely continue, but the amount would significantly decrease as: a) older, decadent components of the timber stands are harvested and eventually replaced with young vigorous trees; and b) species susceptible to current insect infestations and disease infections, such as lodgepole pine, Engelmann spruce, and subalpine fir, are reduced and replaced by more resistant species.

Much of the sawlog volume in the project area that is most susceptible to loss of value from stem rot infection would be harvested.

#### **Cumulative Effects**

- ***Cumulative Effects of Both Alternatives to Insects and Diseases***

Forest-management treatments similar to the ones proposed in this project are being proposed and initiated on Stillwater State Forest. These treatments promote regeneration and retain a diverse species mix of trees that are more vigorous and less susceptible to insect and disease attacks.

### **FOREST FUELS**

#### **EXISTING CONDITIONS**

##### **Fire Regime**

The fire regimes for the Mud Lake and Moose Creek sections are generally in cool habitat groups with about one-half of each section having moist habitat type groups and the other half slightly drier. The drier habitat group is defined in Fire Group 7 and the moister group in Fire Group 9 (*Fischer et al*).

The stand conditions within the 80-to-110-year age class of Fire Group 7 and 9 are usually dominated by lodgepole pine. Both habitat groups will have Douglas-fir and western larch, with the Fire Group 9 having a higher component of Engelmann spruce and subalpine fir.

Wildfires within Group 7 have generally burned through the stands before the lodgepole pine dies out. Recurring low-intensity wildfires thin and rejuvenate stands without doing serious damage; however, in stands that have not burned in 60-plus years, fuels can build up to hazardous levels.

Within Group 9, the combination of deep duff and large amounts of dead and rotten fuel can result in severe surface fires during unusually dry conditions.

Much of the downed woody fuels found within the proposed harvest units result from accumulating deadfalls; this deadfall is primarily the

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larger diameter lodgepole pine that died during the 1970s and 80s mountain pine beetle epidemics. Despite the heavy fuel loadings that characterize these stands, fire hazard is normally low to moderate under normal weather conditions; however, the North Fork Flathead River drainage has been experiencing drought conditions for the past 10 years, which sets the stage for severe, widespread fires.

### ALTERNATIVE EFFECTS TO FOREST FUELS

#### Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Forest Fuels***

Stands would continue to retain ladder fuels and downed woody fuels and have very high amounts of trees per acre until a disturbance, man-caused or natural, occurs. Risks of torching and crown fires would likely remain high, as would the risk of high-intensity wildfires.

- ***Direct and Indirect Effects of the Action Alternative to Forest Fuels***

Harvested areas would retain approximately 8 to 15 tons of large woody debris following site-preparation treatments. During the first season after harvesting, the wildfire hazard may increase due to the high amount of slash loading. Although fire is always a potential, ladder fuels to crowns would be removed in the proposed harvest units and fuel treatments would limit the fire intensity under most circumstances. As a result, fire hazards would be substantially reduced for an extended period of time.

Areas utilizing a commercial-thin harvest treatment would reduce the amount of trees and, thereby, reduce fuel loads. The connectivity of fuel and ladder fuels may not be reduced. In some circumstances, a continued risk of wildfires may occur due to an

increased amount of air flow, dry fuels on the forest floor, and ladder fuels that have not been significantly reduced.

The proposed harvesting would also decrease the risk of uncontrollable fires to adjacent land and homesites. The thinning and removal of forest fuels and the slash piling and burning of downed woody fuels would be expected to decrease fire intensities, which would allow fire personnel to control fires more easily.

#### Cumulative Effects

- ***Cumulative Effects of the No-Action and Action Alternatives to Forest Fuels***

Past timber harvests, fuel treatment projects, and natural wildfires have created age-class mosaics across the landscape of the North Fork Flathead River drainage. These mosaics break up the continuity of fuels and behave as natural fire breaks. Maintaining an age-class mosaic in conjunction with fuel-treatment projects would reduce the potential of high-intensity wildfires.

## NOXIOUS WEEDS

### EXISTING CONDITION

A noxious weed is defined as a nonnative plant competing with desirable plants for nutrients, water, and sunlight and is harmful to agriculture, wildlife, forestry, and other beneficial uses, thus reducing the value and productivity of the land. Most noxious weeds are exotic species, originating in Eurasia (*Flathead County Weed-Management Plan*). The following weeds have been located on DNRC ownership and along access routes to the project areas:

- Spotted knapweed (*Centraurea maculosa*)
- St. John's-wort (*Hypericum perforatum*)

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- Oxeye daisy (*Chrysanthemum leucanthemum*)
- Hound's-tongue (*Gynoglossum officinale* L.)

The species listed are Category 1 weeds, which are established weeds with high disbursement. Management criteria for the species include awareness and education, containment and suppression of existing infestations, and prevention of new infestations (*Flathead Weed Management Plan, 2007*).

### ALTERNATIVE EFFECTS TO NOXIOUS WEEDS

#### Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Noxious Weeds***

Additional mineral soil would not be exposed and heavy tree canopies would continue to compete with weeds; therefore, the risk of additional establishment of weed populations would not increase. Currently, the project area is used extensively for dispersed recreation and weed seed is introduced primarily from motor vehicle use. Established infestations of noxious weeds are being addressed with an ongoing program of site-specific herbicide spraying along roads and in small areas of infestation.

- ***Direct and Indirect Effects of the Action Alternative to Noxious Weeds***

The proposed activities would result in an increase in ground disturbance. Mechanized equipment and ground disturbance could increase or introduce noxious

weeds along roads and throughout forested areas. Weed seeds are likely to be scattered throughout the forested areas, and the reduction of canopy and resultant disturbance from the timber-harvesting activities are expected to provide the catalyst for spread. Mitigation measures that would be applied and may reduce the spread and introduction of noxious weeds include:

- washing equipment before entering the site,
- sowing grass seed along roads after disturbances such as reconstruction or reclamation,
- applying herbicide applications along roadsides and on spots of weed outbreaks, and
- monitoring.

#### Cumulative Effects

- ***Cumulative Effects of the Action and No-Action Alternatives to Noxious Weeds***

The open roads in the project area have traffic from dispersed recreation, timber-management activities, and other uses on a regular basis. These disturbances increase exposure to weed establishment. Over time, the weed-management program at Stillwater Unit, including cooperation with the USFS and the Flathead County Weed Department, has improved.

# SOILS ANALYSIS

## INTRODUCTION

### ***LANDFORM DESCRIPTION***

The North Fork Flathead River, including the Moose Creek and Mud Lake sections, lies within a valley formed by glaciers and river processes. The dominant landtypes found in the project area include stream breaklands, organic depressions, moraines, kames and kettles, glacial outwash, and glaciated mountain slopes. The primary parent material for each of these landtypes is glacial till derived from argillite, siltite, and limestone from the Belt Supergroup. Surface soil for each project-area landtype is volcanic ash influenced loess.

### ***SOIL PHYSICAL PROPERTIES***

This analysis addresses the issue that timber harvesting and associated activities may affect soil conditions in the proposed project area through ground-based activities and through repeated entries to previously harvested areas. The operation of ground-based machinery can displace fertile layers of topsoil, which can lead to a decrease in vegetation growth. Ground-based machinery can also lead to compaction of the upper layers of soil. Compaction decreases pore space in soil, reduces its ability to absorb and retain water, and can increase runoff and overland flow. These conditions can also lead to a decrease in vegetation growth.

### ***SLOPE STABILITY***

Slope stability can be affected by timber-management activities by removing stabilizing vegetation, concentrating runoff, or increasing soil moisture. The primary risk areas for slope stability problems include, but are not limited to, landtypes that are prone to soil mass movement and soils on steep slopes (generally over 60 percent).

## ANALYSIS METHODS

### ***SOIL PHYSICAL PROPERTIES***

Impacts to soil physical properties will be analyzed by evaluating current levels of soil disturbance in the proposed project area based on field review and aerial photo review of existing and proposed harvest units. Percent of area affected is determined through pace transects, measurement, aerial-photo interpretation, or GIS (Geographical Information System) to determine the spacing and width of skid trails. From this, skid trail density and percent of area impacted are determined. Estimated effects of proposed activities will be assessed based on findings of DNRC soil monitoring.

### ***SLOPE STABILITY***

Slope stability risk factors will be assessed by reviewing the FNF Land System Inventory to identify landtypes listed as high risk for mass movement. Field reconnaissance was used to identify slopes greater than 60 percent as an elevated risk for mass movement.

### ***ANALYSIS AREA***

The analysis area for evaluating soil physical properties and slope stability will include DNRC-managed land within the North Fork by Two Timber Sale Project area. The Moose Creek portion of the proposed project is located almost entirely within the Moose Creek watershed; a small portion is located outside of this watershed with no identifiable surface water features. The Mud Lake portion of the project is located primarily on glacial moraines and sideslopes adjacent to the North Fork Flathead River floodplain.

## SOILS ANALYSIS

### EXISTING CONDITIONS

#### SOIL PHYSICAL PROPERTIES

##### ► Moose Creek Section

The Moose Creek parcel has not been managed for timber, so no impacts to soil physical properties were found beyond those occurring from natural conditions and events.

##### ► Mud Lake Section

The Mud Lake parcel has not been managed for timber since 1980, and prior to that, not since the 1950s. Timber sale records dating back to the 1950s show that approximately 181 acres of timber have been harvested in the Mud Lake parcel using ground-based harvesting methods. Ground-based yarding can create soil impacts through displacement and compaction of productive surface layers of soil, mainly on heavily used trails. Existing skid trails are spaced at least 50 feet apart, and none were identified as erosion or sediment sources. Trails are still apparent, but most are well vegetated; past impacts are beginning to ameliorate from freeze-thaw cycles and root penetration. Based on pace transects of trail spacing, knife penetration tests for compaction, and ocular estimates of revegetation, less than 15 percent of previously ground-skidded harvest units are in an impacted condition on the Mud Lake parcel.

#### SLOPE STABILITY

##### ► Moose Creek Section

Landtypes in the Moose Creek parcel vary from stream breaklands to glacial kames and kettles above the stream breaks. The FNF Land System Inventory identified stream breaklands (landtype 74) as high risk for mass movements in the project area. No slope failures were identified during

reconnaissance in the parcel, but slopes are generally greater than 60 percent above Moose Creek and have individual trees with 'pistol butts' or swept bases. No other signs of slope instability were found and no other landtypes in the Moose Creek Section are identified as a risk for slope stability problems. A list of landtypes found in the proposed project area and the associated management implications are found in *TABLE III-5 - SOIL MAP UNIT DESCRIPTIONS FOR THE NORTH FORK BY TWO TIMBER SALE PROJECT AREA*.

##### ► Mud Lake Section

Landtypes in the Mud Lake Section vary from nearly level wetlands and organic depressions to glaciated mountain slopes in the western portion of this parcel. The FNF Land System Inventory identified no areas of soils at high risk for mass movements in the Mud Lake Section. No slope failures were identified during reconnaissance in the proposed project area, and slopes are less than 60 percent. Because no slope-stability risk factors are present in the Mud Lake portion of the proposed project area, slope stability will not be evaluated on this section in the remainder of this analysis. A list of landtypes found in the Mud Lake Section and the associated management implications are found in *TABLE III-5 - SOIL MAP UNIT DESCRIPTIONS FOR THE NORTH FORK BY TWO TIMBER SALE PROJECT AREA*.

### ALTERNATIVE EFFECTS TO SOILS

#### DIRECT AND INDIRECT EFFECTS

##### • *Direct and Indirect Effects of the No-Action Alternative to Soils*

This alternative would have no direct or indirect effects on soil physical properties or slope stability. No ground-based activity would take place under this alternative, which would

## SOILS ANALYSIS

leave the soil in the project area unchanged from the description in the *EXISTING CONDITIONS* portion of this analysis.

- ***Direct and Indirect Effects of the Action Alternative on Soils***

- \* **Soil Physical Properties**

**Moose Creek Section** - Based on DNRC monitoring of timber harvest effects to soils on sites similar to those found in the Moose Creek Section, direct impacts would be expected on up to 42 of the total 464 acres proposed for harvesting. Soil monitoring conducted on DNRC-managed lands shows that sites harvested on DNRC-managed lands statewide on similar soils with ground-based machinery had a range of impacts from 6.4 to 9.0 percent of the acres treated, with an average disturbance rate of 7.0 percent (DNRC, 2004). The low range of impacts includes operations on frozen or snow-covered soils, and the high range includes operations on dry soils during nonwinter conditions. As a result, the extent of impacts expected would likely be similar to those reported by Collins (DNRC, 2004), or approximately 6.4 to 9.0 percent of ground-based harvested acres. Ground-based site preparation would also generate direct impacts to the soil resource. Site-preparation disturbance would be intentionally done; these impacts are considered light and promote reforestation of the site. Approximately 0.25 mile of new road and approximately 0.75 mile of temporary road would be constructed on the Moose Creek parcel with the Action Alternative. These acres of road activity would be permanently taken out of timber production and converted to transportation. *TABLE III-4 - SUMMARY OF DIRECT EFFECTS OF*

*ALTERNATIVES ON SOILS* summarizes the expected impacts to the soil resource as a result of the Action Alternative.

**Mud Lake Section** - Based on DNRC monitoring of the effects of timber harvesting to soils on sites similar to those found in the Mud Lake Section, direct impacts would be expected on up to 10 of the total 174 acres proposed for harvesting. Soil monitoring conducted on DNRC-managed lands shows that sites harvested on DNRC-managed lands statewide on similar soils with ground-based machinery had a range of impacts from 4.4 to 8.1 percent of the acres treated, with an average disturbance rate of 6.0 percent (DNRC, 2004). The low range of impacts includes operations on frozen or snow-covered soils, and the high range includes operations on dry soils during nonwinter conditions. As a result, the extent of impacts expected would likely be similar to those reported by Collins (DNRC, 2004), or approximately 4.4 to 8.1 percent of ground-based harvested acres.

**Both Sections** - These activities would leave up to 9 percent of the proposed harvest units in an impacted condition. Levels are below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the SFLMP and well within the 15-percent impacted area established as a level of concern in the SFLMP (DNRC 1996). In addition, BMPs and a combination of mitigation measures would be implemented to limit the area and degree of soil impacts as noted in ARM 36.11.422 and the SFLMP (DNRC, 1996).



## SOILS ANALYSIS

### \* Slope Stability

**Moose Creek Section** - No ground-based activities are proposed on landtype 74 with this project proposal. Small, isolated areas of timber are proposed for commercial thinning on this landtype, but these areas would have equipment restricted from operation where slopes are over 40 percent and logs would be yarded with cable or winch systems that carry logs to the flat terraces. The commercial thinning prescription in these areas is not expected to have an adverse effect on slope stability.

similar to those described in the *EXISTING CONDITIONS* portion of this analysis. No soil would be disturbed and no reentry of past harvest units would occur. All impacts from past management activities would continue to improve or degrade as dictated by natural and preexisting conditions.

### • *Cumulative Effects of the Action Alternative to Soils*

#### \* Soil Physical Properties

**Moose Creek Section** - None of the acres proposed for harvesting with the Action Alternative have been previously managed for timber. As a result, the cumulative impacts to the soil physical properties in this parcel would be the same as those listed in the *DIRECT AND INDIRECT EFFECTS* section above.

**Mud Lake Section** - Approximately 38 acres with previous timber sale operations would be entered. These acres would include only the 1950s-era management; none of the areas managed since the 1985 timber sale would be reentered. Cumulative effects to soils may occur from repeated entries into a forest stand where additional ground is impacted by equipment operations.

Existing skid trails where compaction has begun to ameliorate through freeze-thaw cycles and revegetation would return to a higher level of impact due to the Action Alternative. Additional trails may also be required if existing trails are identified in undesirable locations. In the remaining stands where

**TABLE III-4 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS**

DESCRIPTION OF PARAMETER	ALTERNATIVE			
	NO-ACTION	ACTION		
		MOOSE CREEK	MUD LAKE	TOTALS
Acres of harvesting	0	464	132	638
Acres of tractor yarding	0	464	132	638
Average acres of ground-based impacts	0	42	10	52
Acres of new and temporary road construction	0	4	0	4
Total acres of moderate impacts	0	46	10	56
Percent of harvest area with impacts	0	10	6	9

### **CUMULATIVE EFFECTS**

### • *Cumulative Effects of the No-Action Alternative to Soils*

#### \* Soil Physical Properties

This alternative would have no cumulative impacts to physical properties of soils in the project area. The impacts of this alternative would be

## SOILS ANALYSIS

timber has not been harvested in the past, the cumulative impacts to the soil physical properties in this parcel would be the same as those listed in the *DIRECT AND INDIRECT EFFECTS* section. Cumulative impacts to soil physical properties under the Action Alternative would fall below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the SFLMP and are well within the 15-percent impacted area established as a level of concern in the SFLMP (DNRC, 1996).

DNRC would minimize long-term soil impacts and adverse cumulative effects by implementing any or all of the following:

- 1) Existing skid trails from past harvesting activities would be used if they are properly located and spaced.
- 2) Additional skid trails would be used only where existing trails are unacceptable.
- 3) Potential direct and indirect effects with soil-moisture restrictions, season of operation, and method of harvesting would be mitigated.
- 4) A portion of coarse woody debris and fine litter would be retained for nutrient cycling.

In previously unharvested stands, cumulative effects to soil productivity from multiple entries would be the same as those listed in the *DIRECT AND INDIRECT EFFECTS* sections.

### \* Slope Stability

**Moose Creek Section** - With the Action Alternative, none of the acres with soils at risk for mass failure have been previously managed for timber. As a result, the cumulative impacts to the slope stability in this parcel would be the same as those listed in the *DIRECT AND INDIRECT EFFECTS* section.

# SOILS ANALYSIS

TABLE III-5 - SOIL MAP UNIT DESCRIPTIONS FOR THE NORTH FORK BY TWO TIMBER SALE PROJECT AREA

MAP UNIT <sup>1</sup>	DESCRIPTION	SOIL DRAINAGE	ROAD LIMITATIONS	TOPSOIL DISPLACEMENT AND COMPACTION	SEEDLING ESTABLISHMENT	EROSION (BARE SURFACE)	NOTES
12	Organic depressions	Poor	Severe	Severe	Poor	Slight	Wetland soil types, avoid operation.
26J-7	Glacial moraines, 10 to 20%	Well drained	Low	Moderate (severe if wet)	Good	Moderate	Deep, productive soil. Topsoil depth important. Frost pockets may hinder seedling establishment in low areas.
26L-7	Glacial moraines, 0 to 20%	Well drained	Low	Moderate (severe if wet)	Good	Moderate	Deep, productive soil. Topsoil depth important.
26L-8	Glaciated mountain slopes, 20 to 40%	Well drained	Moderate	Moderate (severe if wet)	Good	Moderate	Deep, productive soil. Topsoil depth important. Road cut slopes may slough if steep.
27-7	Glacial kames and kettles, 10 to 20% slopes	Well Drained	Low	Low	Fair	Moderate	Deep soil, low fertility. Topsoil depth is very important.
28-7	Glacial outwash, 0 to 20%	Well drained	Low	Moderate	Moderate to droughty	Low	Topsoil depth is very important.
74	Stream breaklands, slopes over 60%	Fair to good Droughty on south Slopes	Moderate to severe (steep)	High displacement	Fair, competition	High	Steep slopes require cable operation.

<sup>1</sup>Flathead National Forest Land Types. Interpretations taken from: USDA Forest Service. 1998. Soil Survey of the Flathead National Forest Area, Montana. USDA Forest Service and Natural Resources Conservation Service.

## SOILS ANALYSIS

*FIGURE III-1 - MOOSE CREEK SECTION SOIL MAP*





## SOILS ANALYSIS

FIGURE III-2 - MUD LAKE SECTION SOIL MAP



## **WATERSHED AND HYDROLOGY ANALYSIS**

### **INTRODUCTION**

#### ***WATER QUALITY***

The primary parameter of concern for water quality is sediment. Increased sediment delivery and deposition can affect physical and biological water quality, channel stability, and geomorphology. Sediment yield can be affected by a number of activities. Timber harvesting and associated road construction can increase sediment yield through exposure of bare soil. These impacts can be mitigated through implementation of BMPs and other erosion-control measures.

#### ***WATER YIELD***

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Similarly, effects of stand-replacement wildfire also affect water quantity and yield in a watershed. Water yields increase proportionately to the percentage of canopy removal because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition.

### **ANALYSIS METHODS**

#### ***WATER QUALITY***

Existing conditions for water quality were analyzed using field site visits and visual inspection of the drainage features and road systems in the proposed project area.

#### ***WATER YIELD***

The water-yield increase for the watershed in the project area was determined using field review and aerial-photo interpretation. Visual inspection of the runoff patterns and stream-channel stability within the proposed project area were used to assess the impacts of past management to water yield. Aerial-photo interpretation was used to determine the extent of past management in the project-area watersheds.

### **ANALYSIS AREA**

#### ***WATER QUALITY***

The analysis area for water quality is the DNRC-managed State ownership in the Mud Lake and Moose Creek sections, all forest roads that lead into these sections from other ownerships, and those roads described in *CHAPTER II - ALTERNATIVES*. The primary focus of the sediment-delivery analysis was on the streams and draws located within the proposed project area.

#### ***WATER YIELD***

The analysis area for water yield is the Moose Creek watershed and the first-order tributaries to the North Fork Flathead River found in the Mud Lake Section.

### **EXISTING CONDITIONS**

#### ***REGULATORY FRAMEWORK***

- **Montana Surface Water Quality Standards:** According to *ARM 17.30.608 (1)(a)(viii)*, the Main Stem North Fork Flathead River is classified as A-1. Among other criteria for A-1 waters, no increases are allowed above naturally occurring levels of sediment or turbidity. "Naturally occurring," as defined by *MCA 17.30.602 (17)*, includes conditions or materials present during runoff from developed land



## WATERSHED AND HYDROLOGY ANALYSIS

where all reasonable land, soil, and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of potentially impactful activities.

According to ARM 17.30.608 (1) (a), this portion of the Flathead River drainage, including Moose Creek and its tributaries, and the unnamed streams in Section 16, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases over natural

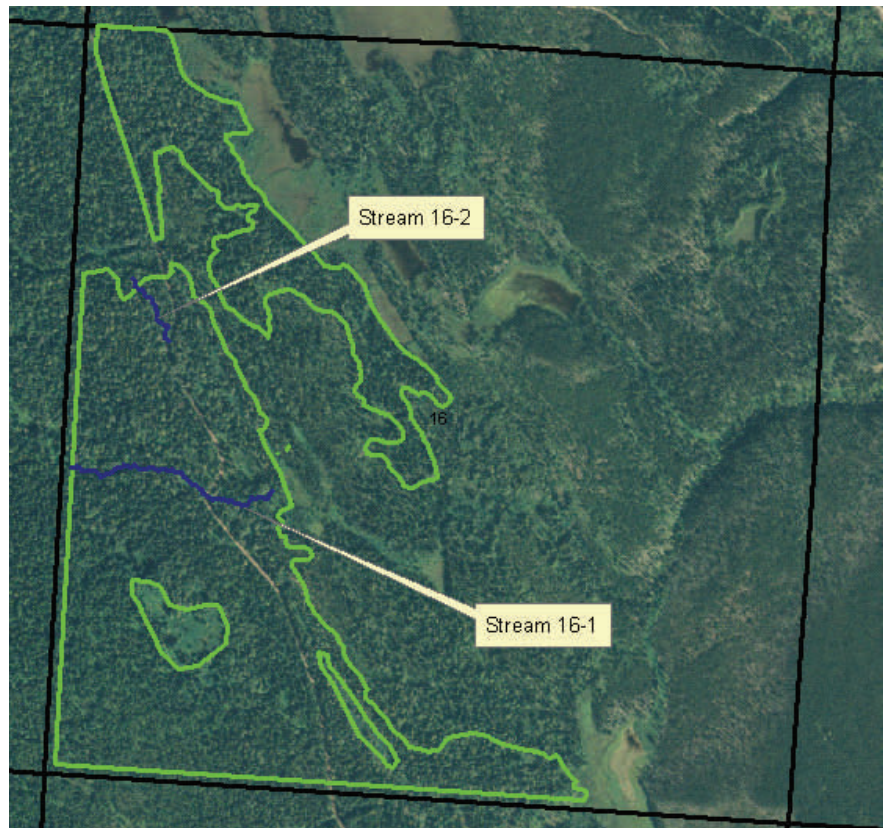
turbidity. As defined by ARM 17.30.608, 'naturally occurring' includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (commonly called BMPs) have been applied.

Designated beneficial surface-water uses within the project area include cold-water fisheries, and a provisional claim for domestic water use in Moose Creek upstream from the proposed project area. For an

analysis of the proposed project effects on the fish resource in the project area, refer to the *FISHERIES ANALYSIS* portion of this EA.

- **Water-Quality-Limited Waterbodies:** No portion of the proposed project area is listed in the 2006 *List of Waterbodies in Need of Total Maximum Daily Load (TMDL) Development* publication produced by the Montana Department of Environmental Quality (DEQ, 2006).
- **Montana SMZ Law:** By the definition in ARM 36.11.312, Moose Creek is a Class 1 stream (fish-bearing), stream 16-1 (*FIGURE III-1 - STREAM MAP FOR SECTION 16, T37N, R22W*) is a Class 2 stream (flows more than 6 months and does not contribute to another body of water), and stream 16-2 is a Class 3 stream (flows less than 6 months and does not contribute to another body of water).

**FIGURE III-3—STREAM MAP FOR SECTION 16, T37N, R22W**



## WATERSHED AND HYDROLOGY ANALYSIS

### **WATER QUALITY**

#### ► **Moose Creek Section**

The Moose Creek Section is currently accessed on the south side of the section by USFS-owned Moose Creek Road (USFS 210C) and accessed on the northern portion of the section by a private road system through Section 30, T36N, R21W, and Section 25, T36N, R22W. Moose Creek Road meets BMP standards; the private road system does not meet the BMP standards for timber harvesting. Currently, no stream crossings are in the Moose Creek portion of the project area. No sediment delivery was observed on these road systems during field reconnaissance, but the lack of BMPs does leave the area with an elevated risk of erosion and sediment delivery.

#### ► **Mud Lake Section**

The existing road system in the Mud Lake Section is a combination of low-standard forest roads that do not meet BMPs for surface drainage or erosion control and a county road that does meet BMPs for surface drainage or erosion control in places. Several stream crossings are located on the county road in this parcel. Each is adequately sized, but surface drainage is not routed away from the crossing structures and ditch delivery is not filtered. In the eastern portion of the proposed project area, the road system has several stream crossings. These crossings are adequately sized and well vegetated, but are in need of improvements in reference to BMPs and erosion control. One of these culverts was blocked by a beaver dam in the last 10 years, but is currently free of debris and passing water as designed.

**Cost-share roads** - The cost-share roads are all existing roads; in addition to Moose Creek Road, Hornet/Whale Creek Road (USFS 318) is open to public motorized use

and meets BMPs due to the recent timber sale activity. Sediment increases at the stream crossings have been minimized through maintenance, increased surface drainage, and revegetation.

The road in Section 20, T34N, R20W, near Coal Creek has limited access due to an existing gate and currently meets BMPs.

The segment of road within Section 2, T34N, R21W, is brushed in, has not been used in the past 15 years, and is more than 75-feet from Moran Creek. Prior to future use, this short segment would be brushed and improved to meet BMPs.

### **WATER YIELD**

Past activities in and around the proposed project area include timber management, agriculture, and homesite development. These activities have led to reductions in forest canopy cover and construction of roads. Following field reconnaissance of the proposed project area, determination was made that a detailed water-yield analysis would not be necessary in the proposed project area for the reasons stated below. The water-yield impacts of all roads, including cost-share roads, were considered in the following assessments.

#### ► **Moose Creek Section**

The Moose Creek parcel has not been managed for timber. Past and ongoing land-management activities adjacent to DNRC-managed land in the Moose Creek watershed have had no visible effect on the stream channels in the Moose Creek parcel. Moose Creek flows through the center of the proposed project area in the Moose Creek Section and has a stable, well-armored channel with a healthy brush and shrub community. Also, a first-order ephemeral tributary to Moose Creek flows across the north portion of this parcel. Its



## WATERSHED AND HYDROLOGY ANALYSIS

channel is well vegetated with grass and forbs and only flows water during high runoff events. Field reconnaissance of the proposed project area showed that existing stream channels are stable and not actively eroding. Most of the Moose Creek parcel is located within the 12,067-acre Moose Creek watershed. A detailed water-yield analysis will not be completed for the Moose Creek watershed since aerial-photo interpretation and field reconnaissance show that approximately 13 percent of the watershed has been harvested or burned. Even the most cautious and conservative water-yield thresholds are not approached until harvesting and wildfire activities exceed 25 percent of the watershed acres. This is in accordance with DNRC's Administrative Rules for Forest Management (ARM 36.11.423).

### ► **Mud Lake Section**

The Mud Lake parcel has not been managed since 1980 and, prior to that, not since the 1950s. Past timber-management activities have had no visible effect on the stream channels located in the Mud Lake parcel except for the existing stream crossings. Several small stream channels deliver surface water to wetlands during spring runoff. These channels have a bankfull width of 2 to 3 feet, and are well vegetated with an array of grasses, forbs, and shrubs. In most cases, these channels have no scoured bottom. They meet the definition of a creek due to the presence of a definable bank to confine and conduct water. Field reconnaissance of the proposed project area showed that existing stream channels are stable and not actively eroding. Channel bottoms are vegetated and very stable. Because of the intermittent and discontinuous nature of the

streams in the Mud Lake Section, the stable nature of the channels, and the ability of wetlands to store peaks in runoff, the proposed project area is a low risk for impacts to water yield, and a detailed analysis of watershed cumulative effects is not necessary for this parcel (ARM 36.11.423).

## ALTERNATIVE EFFECTS TO WATERSHED AND HYDROLOGY

### DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative to Watershed and Hydrology***

Direct and indirect effects of this alternative would be similar to conditions described under the existing conditions for water quality and water yield. The water quality and water yield would be unaffected, and the streams in the proposed project area would continue to be affected by natural and preexisting conditions.

- ***Direct and Indirect Effects of the Action Alternative to Watershed and Hydrology***

### WATER QUALITY

**Moose Creek Section** - The action alternative would improve the erosion control and surface drainage on approximately 1 mile of existing road in the Moose Creek Section, bringing the road up to applicable BMP standards. In addition, approximately 0.25 miles of new road and approximately 0.75 miles of temporary road would be constructed to access the proposed harvest units. All new road construction is located away from streams, would comply with applicable BMP standards, and leave closed and temporary roads with all the necessary erosion control to provide long-term protection from erosion and sediment delivery. Following project implementation, the risk

## WATERSHED AND HYDROLOGY ANALYSIS

of sediment delivery from roads in the Moose Creek Section would be lower than the existing conditions due to the addition of BMPs for erosion control on the existing road system.

No impacts to water quality from timber harvesting are expected in the Moose Creek portion of the proposed project area. All proposed ground-based yarding would take place on level to gentle slopes (0 to 10 percent) above the steep slope breaks of the Moose Creek valley, be located 100 to 200 feet away from stream channels and draw bottoms, and minimize the operation of ground-based equipment within 25 feet of steep slope breaks. As a result, no bare-soil disturbance is expected within 100 to 200 feet of streams and draws and a 100- to 200-foot vegetated filter would remain intact between harvesting activity and any streams or draws.

**Mud Lake Section** - The action alternative would reopen approximately 0.4 miles of an existing low-standard road in the Mud Lake Section to haul timber. The road is located west of the county road and does not cross any streams or draws. The project proposal would improve the erosion control and surface drainage on this road and bring the road up to applicable BMP standards. No new road construction is proposed in the Mud Lake portion of the proposed project area. Due to the addition of BMPs for erosion control on the existing road system, the risk of sediment delivery from roads in the Mud Lake Section would be lower than the existing conditions following project implementation.

No impacts to water quality from timber harvesting are expected in the Mud Lake portion of the proposed project area. All proposed ground-based yarding would take place on gentle

sideslopes and would not occur within 50 feet of a stream or wetlands greater than 0.25 acre. Due to the gentle to level topography (0 to 15 percent) adjacent to stream channels found in and around the proposed harvest units and the implementation of all applicable BMPs on roads and skid trails, a low risk of bare-soil erosion being delivered to a stream or draw is likely.

**Cost-share roads** - Beyond those impacts described for the Moose Creek Section, no change would occur to these roads as a result of this project.

### WATER YIELD

#### **Moose Creek Section** -

Approximately 453 of the acres proposed for harvesting in the Moose Creek Section are located within the Moose Creek watershed. This level of harvesting may generate a water-yield increase of up to 2 percent in the Moose Creek watershed. No changes to channel stability are expected in Moose Creek or its tributaries as a result of the Action Alternative. The stability of channels would be sufficient to handle projected water-yield increases without measurable change. As a result, no direct or indirect impacts to water yield are expected in the Moose Creek watershed as a result of the proposed Action Alternative.

**Mud Lake Section** - Approximately 174 acres of timber would be commercially thinned in the Mud Lake portion of the proposed project. This level of harvesting would not be sufficient to generate measurable increases in water yield in any streams located within or near this portion of the project area or cause channel instability. No changes to channel stability are expected as a result of the Action Alternative. Therefore, no direct

## WATERSHED AND HYDROLOGY ANALYSIS

or indirect impacts to water yield are expected in the Mud Lake portion of the project area as a result of the proposed Action Alternative.

### **CUMULATIVE EFFECTS**

- ***Cumulative Effects of the No-Action Alternative to Watershed and Hydrology***

Cumulative effects of this alternative on water quality and water yield would be similar to the situations described in the existing conditions. Water quality and water yield would be unaffected. Streams and draws in the proposed project area would continue to be affected by natural and preexisting conditions.

- ***Cumulative Effects of the Action Alternative to Watershed and Hydrology***

#### **WATER QUALITY**

**Moose Creek Section** - Adverse cumulative effects to water quality are not expected in the Moose Creek Section of the project area. Improvement and installation of erosion control and surface drainage on the existing road system would reduce erosion rates from current levels and reduce the risk of increasing sediment loads to streams or draws. Construction of 0.25 mile of new road and 0.75 mile of temporary road would increase the risk of sediment loads on these sites where vegetation was lost. Ground-based harvesting activities may also increase the risk of erosion by exposing bare soil on skid trails and landings. This risk would be elevated for 2 to 3 years after project completion until sites begin to revegetate. The risk of increasing sediment loads is very small since all proposed activities are located well away from streams or draws.

**Mud Lake Section** - Adverse cumulative effects to water

quality are not expected in the Mud Lake Section of the project area. Risk of sediment delivery in the Mud Lake Section would be slightly higher than current levels. The opening of an existing road in the western portion of the section would create some bare soil on the road surface, which would increase the risk of erosion on the sites where vegetation was lost. Ground-based harvesting activities may also increase the risk of erosion by exposing bare soil on skid trails and landings. This risk would be elevated for 2 to 3 years after project completion until sites begin to revegetate. The risk of increasing sediment loads is very small since all proposed activities are located well away from streams or draws.

**Cost-share roads** - Beyond those impacts described for the Moose Creek Section, no change would occur to these roads as a result of this project.

#### **WATER YIELD**

**Moose Creek Section** - Adverse cumulative impacts to the Moose Creek watershed are not expected as a result of the proposed project for the following reasons:

- 1) The limited area and selective nature of the proposal would not have a measurable effect on the 12,067-acre Moose Creek watershed.
- 2) The high stability of stream channels where they occur shows that the small watersheds are not prone to impacts of water-yield increases.
- 3) The proposed project harvesting, combined with all past harvesting and wildfire activities, would still leave less than 17 percent of the Moose Creek watershed with any

## WATERSHED AND HYDROLOGY ANALYSIS

vegetative removal, and would be well below the 25 percent needed to exceed stringent thresholds of concern.

**Mud Lake Section** - Adverse cumulative impacts to stream channels and downstream waters in and near the Mud Lake Section are not expected as a result of the proposed project for the following reasons:

- 1) The limited area and selective nature of the proposal would not have a measurable effect on

the small, groundwater-fed watersheds in this parcel.

- 2) The high stability of stream channels where they occur shows that the small watersheds are not prone to impacts of water-yield increases.
- 3) The presence of ponds and wetlands within and below the proposed activity act as storage areas for increases in water yield.



## FISHERIES ANALYSIS

### OBJECTIVE

The purpose of this fisheries analysis summary is the assessment of potential impacts to fisheries within the North Fork By Two Timber Sale Project area as a result of the proposed project's No-Action and Action alternatives. (The full fisheries analysis, "*NORTH FORK X 2 TIMBER SALE ENVIRONMENTAL ASSESSMENT - FISHERIES ANALYSIS*", J. BOWER, 18 OCTOBER 2007", can be found in the project file.) This analysis summary follows the line of reasoning described in MEPA for prudent consideration of the foreseeable impacts to a resource as a result of implementing the proposed No-Action and Action alternatives.

### ANALYSIS AREA

The North Fork By Two Timber Sale Project area includes State trust lands within Section 16, T37N, R22W (Mud Lake Section) and Section 36, T36N, R22W (Moose Creek Section). The Mud Lake and Moose Creek sections lie within the North Fork Flathead River - Kishenehn Creek (5<sup>th</sup> code HUC number 1701020601) and North Fork Flathead River - Kintla Lake (5<sup>th</sup> code HUC number 1701020602) drainages, respectively. Up to 596 acres of total harvest area is proposed through 3 different harvest units within the project area.

The 3 harvest units within the project area lie primarily within 2 different subwatersheds (analysis areas) draining to the North Fork Flathead River. From north to south these are the 'Trib 1 to North Fork Flathead River' and 'Moose Creek' watersheds (see *FIGURE III-2 - NORTH FORK BY TWO TIMBER SALE PROJECT AREA AND FISHERIES ANALYSIS AREAS MAP*). Very small portions of the project area within the Moose Creek Section lie within the Lower Whale Creek and Ford Creek subwatersheds. The primary haul route to and from the project area is the North Fork Road,

a county-owned and maintained road, which intersects several other subwatersheds to the North Fork Flathead River.

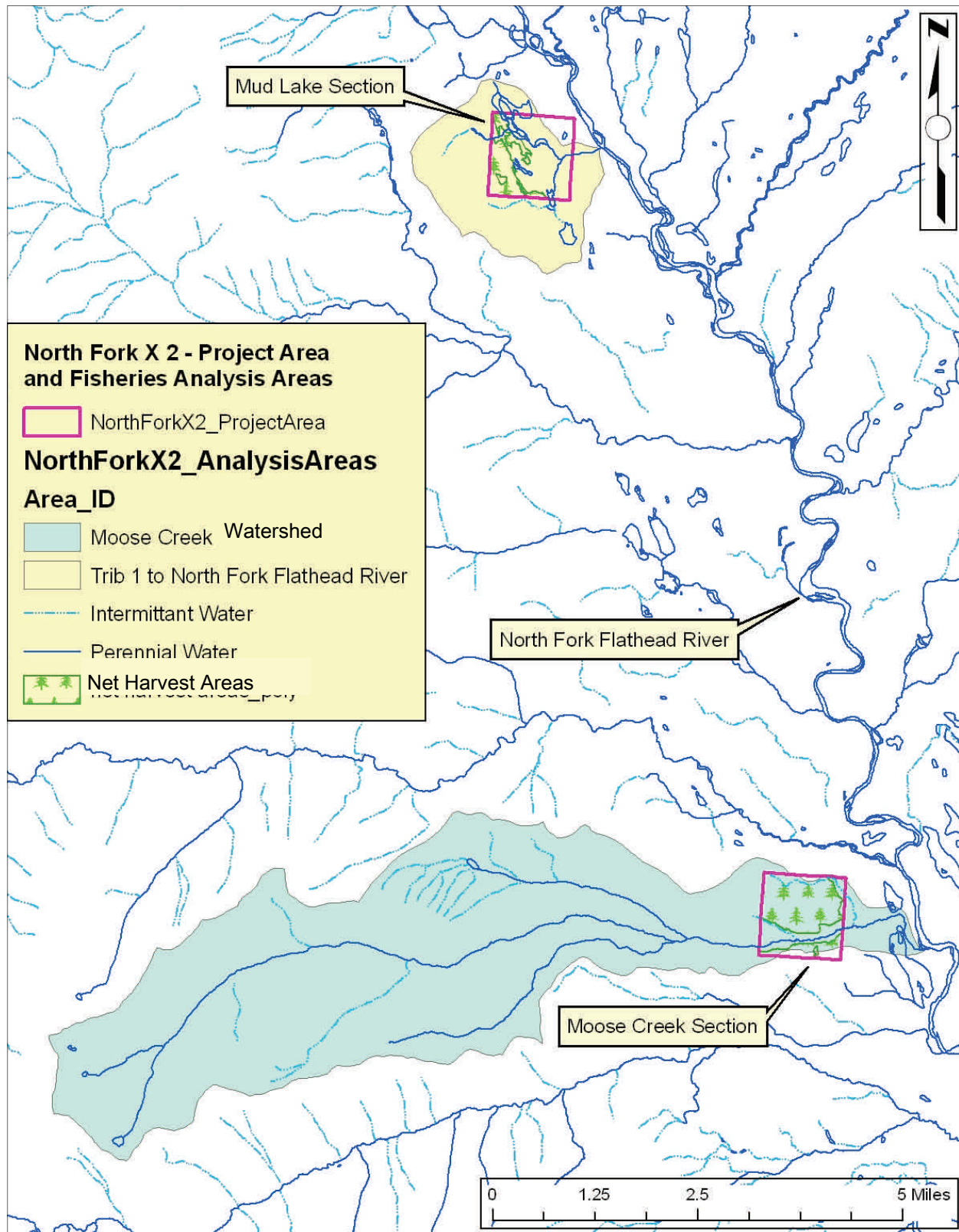
Tributary 1 to North Fork Flathead River, Moose Creek, and North Fork Flathead River adjacent to the project area are not identified on the 2006 Montana 303(d) lists as impaired streams.

Tributary 1 to North Fork Flathead River and Moose Creek drainages adjacent to the project area are classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.608(1)(a)). The North Fork Flathead River is classified as A-1 in the Montana Surface Water Quality Standards (ARM 17.30.608(1)(a)(viii)). B-1 and A-1

classifications are for multiple beneficial use waters including the growth and propagation of cold-water fisheries and associated aquatic life. Among other criteria for B-1 and A-1 waters, a 1 degree Fahrenheit maximum increase above naturally occurring water temperature is allowed within the range of 32 to 66 degrees Fahrenheit (0 to 18.9 degrees Celsius), and no increases are allowed above naturally occurring concentrations of sediment or suspended sediment, which will harm or prove detrimental to fish or other wildlife. In regards to sediment, 'naturally occurring' includes conditions or materials present from runoff or percolation from developed land where all reasonable land, soil, and water conservation practices have been applied (ARM 17.30.603(19)). Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses (ARM 17.30.603(24)). The State has adopted Forestry BMPs through its Non-point Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities (Thomas et al 1990).

## FISHERIES ANALYSIS SUMMARY

FIGURE III-5 - NORTH FORK BY TWO TIMBER SALE PROJECT AREA AND FISHERIES ANALYSIS AREAS MAP



## FISHERIES ANALYSIS SUMMARY

In order to evaluate the existing and potential impacts to fisheries within the project area, two different analysis areas that contain potentially distinct fisheries distributions were initially identified. From north to south these are the 'Trib 1 to North Fork Flathead River' and 'Moose Creek' watersheds (see *FIGURE III-2 - NORTH FORK BY TWO PROJECT AREA AND FISHERIES ANALYSIS AREAS MAP*). The initial analysis areas were chosen because they include (1) the watersheds of known or potential fish-bearing streams or lakes and (2) the proposed harvest units and associated roads that could have foreseeable measurable or detectable impacts to those fish-bearing streams or lakes. The analysis areas are delineated using 6<sup>th</sup> code HUC scale or smaller watershed boundaries.

Other adjacent subwatersheds (Lower Whale Creek, Ford Creek, and other drainages intersected by the North Fork Road) and the North Fork Flathead River are not addressed any further in this fisheries analysis. The proposed Action Alternative is not expected to have any measurable or detectable direct, indirect, or cumulative effects to these subwatersheds or the North Fork Flathead River. In respect to fisheries resources, these other drainages are downstream and/or generally well outside of the project area, and this fisheries analysis is limited in scope to those fish-bearing subwatersheds associated with the project area where a reasonably accurate effects analysis can be conducted.

### ANALYSIS METHODS

The existing conditions of fish populations and habitats will be described for each analysis unit under the *EXISTING CONDITIONS* section of this analysis. The *ENVIRONMENTAL EFFECTS* section will compare existing conditions in each analysis area to the anticipated

effects of the proposed No-Action and Action alternatives to determine the foreseeable impacts to associated fish populations and habitats.

Analysis methods are a function of the types and quality of data available for analysis, which varies among the different analysis areas. The analyses may either be quantitative or qualitative. The best available data for both populations and habitats will be presented separately for the Trib 1 to North Fork Flathead River and Moose Creek analysis areas. In order to adequately address the issues described in *CHAPTER I - PURPOSE AND NEED*, the existing conditions and foreseeable environmental effects to fisheries resources in the analysis areas will be explored using the following outline of issues and subissues:

- Fisheries Populations - Presence/Absence
- Habitat - Channel Forms
  - Fisheries Habitat - Sediment
  - Fisheries Habitat - Flow Regimes
  - Fisheries Habitat - Large Woody Debris
- Habitat - Stream Temperature
  - Fisheries Habitat - Stream Shading
- Habitat - Connectivity
- Existing Collective Impacts and Cumulative Effects

Throughout the *EXISTING CONDITIONS* and *ENVIRONMENTAL EFFECTS* sections, the risk of a particular impact to fisheries resources is described. In terms of the risk that an impact may occur, a low risk of an impact means that the impact is unlikely to occur. A moderate risk of an impact means that the impact may or may not (50/50) occur. A high risk of an impact means that the impact is likely to occur.

A very low impact means that the impact is unlikely to be detectable



## FISHERIES ANALYSIS SUMMARY

or measurable, and the impact is not likely to be detrimental to the resource. A low impact means that the impact is likely to be detectable or measurable, but the impact is not likely to be detrimental to the resource. A moderate impact means that the impact is likely to be detectable or measurable, and the impact is likely to be moderately detrimental to the resource. A high impact means that the impact is likely to be detectable or measurable, and the impact is likely to be highly detrimental to the resource.

Cumulative impacts are those collective impacts on the human environment of the proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type (75-1-220, MCA). The potential cumulative impacts to fisheries in the analysis areas are determined by assessing the collective anticipated direct and indirect impacts, other related existing actions, and future actions affecting the fish-bearing streams.

### EXISTING CONDITIONS

Approximately 5.0 total miles of streams (all stream types) flow through the Mud Lake analysis area. Stream reaches within the analysis area that flow through the Mud Lake Section were surveyed during 2004, 2005, and 2006 to determine the presence and distribution of foreseeable fish species in the project area. Field surveys during 2004 and 2006 by DNRC specialists, which included habitat mapping and electrofishing, revealed no fisheries in the Mud Lake Section. Similar field surveys by DFWP fisheries personnel during 2005 also revealed no fisheries in the Mud Lake Section.

Limiting variables to fish presence in the Mud Lake Section include the lack of wintering habitat, the lack

of seasonal base surface flows, and high peak seasonal temperatures in disconnected perennial and intermittent stream reaches.

Outside of the project area, westslope cutthroat trout may utilize the intermittent channel downstream of the Mud Lake Section and upstream of the confluence with the North Fork Flathead River for spawning immediately following peak seasonal runoff. However, this is unlikely to occur or is otherwise expected to be very sporadic due to limited spawning habitats.

Due to the lack of fisheries resources in the Mud Lake Section and encompassing analysis area, this area is dismissed from further fisheries analysis. No fisheries resources in the Mud Lake analysis area are expected to be affected by the No-Action or Action alternatives.

The Moose Creek analysis area provides habitat for native bull trout, westslope cutthroat trout, and sculpin. All 3 species likely utilize the main stem of Moose Creek flowing through the Moose Creek Section for variable levels of wintering, spawning, and rearing habitat. Nonnative fish species are not known to occur in the analysis area. (MFISH 2007)

An unnamed, spring-fed tributary to Moose Creek in the northeast corner of the Moose Creek Section (see *FIGURE III-6 - MOOSE CREEK SECTION MAP*) was field surveyed during 2007 by DNRC specialists for fisheries resources. Although no fisheries were observed in this spring-fed stream during the field survey, the stream is considered fish-bearing for land management purposes. The stream exhibits high amounts of potential rearing and wintering habitat for juvenile and subadult bull trout. Westslope cutthroat trout are also expected to occasionally utilize this stream habitat.

## FISHERIES ANALYSIS SUMMARY

An intermittent tributary to Moose Creek in the southwest corner of the Moose Creek Section (see *FIGURE III-6 - MOOSE CREEK SECTION MAP*) was also field surveyed during 2007, but was not found to provide any fisheries habitat.

In terms of MEPA analysis, the fisheries resource variables of: channel forms, sediment, flow regimes, large woody debris, stream temperature, stream shading, connectivity, and existing collective impacts (developed through public and internal scoping) are not described in detail for *EXISTING CONDITIONS*. All fisheries resource variables considered for this analysis were evaluated during 2007 field surveys conducted by a DNRC fisheries biologist and hydrologist. All fisheries resources adjacent to fish-bearing streams were considered to be intact and functioning normally within expected ranges of variability. No unusual and recent natural or manmade disturbances to any fisheries resources in this section of the project area were observed.

Other related existing actions within the analysis area include general harvesting, road maintenance, and site-preparation activities associated with the Red Whale Timber Sale (USFS-administered lands) and occasional recreational fishing. These other related existing actions are considered to have a general low risk of very low impacts to fisheries in the analysis area.

## ENVIRONMENTAL EFFECTS TO FISHERIES

### *DIRECT AND INDIRECT EFFECTS*

- ***Direct and Indirect Effects of the No-Action Alternative to Fisheries***

No direct or indirect effects are expected to fisheries resources in the Mud Lake or Moose Creek analysis areas.

- ***Direct and Indirect Effects of the Action Alternative to Fisheries***

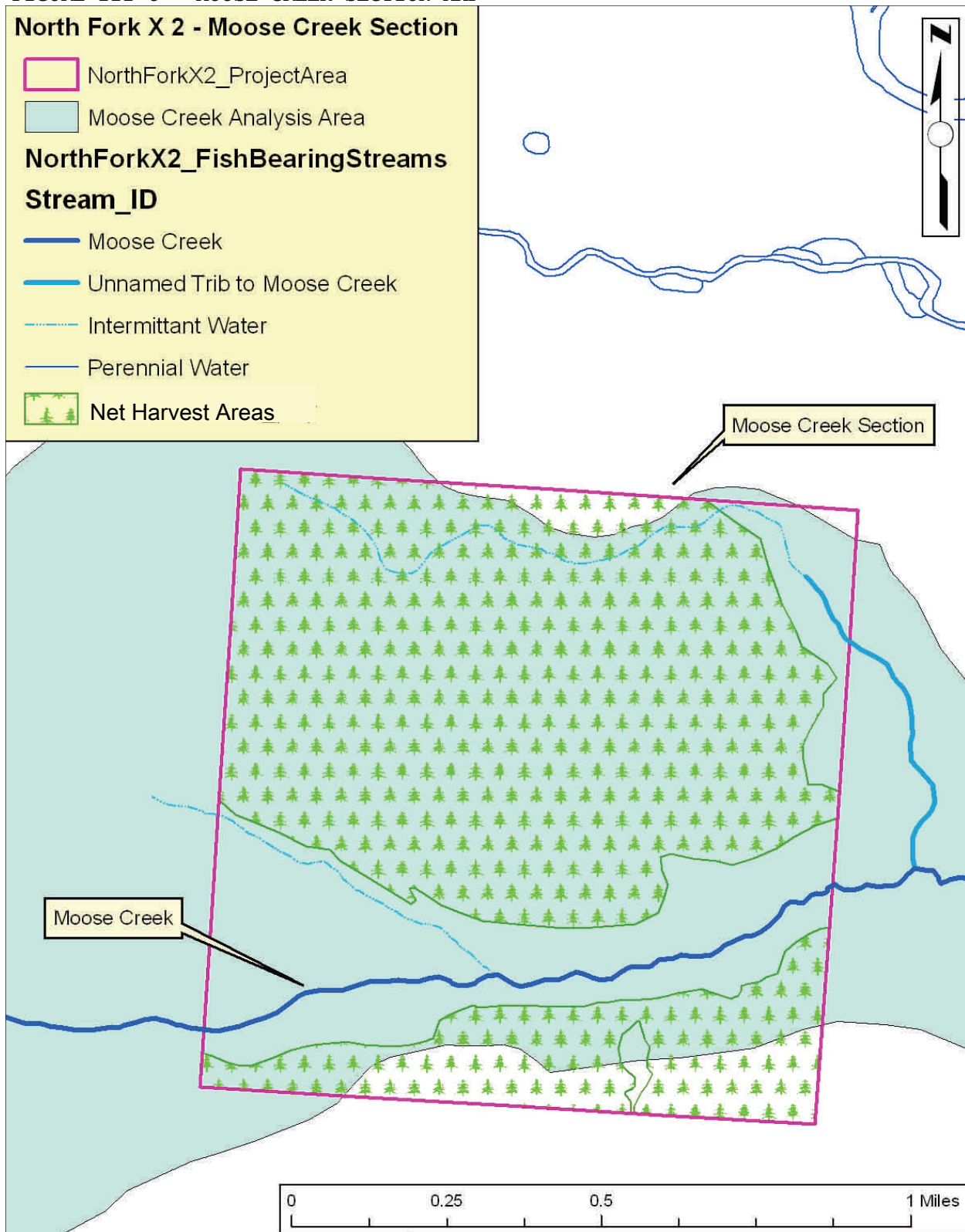
No fisheries resources in the Mud Lake analysis area are expected to be affected by actions associated with the Action Alternative; no direct or indirect effects are expected to fisheries resources in the Mud Lake analysis area.

Examples of actions that may negatively affect native bull trout, westslope cutthroat trout, and sculpin presence or distribution in the Moose Creek analysis area include the introduction of other nonnative fish species, targeted fish suppression or other removal, stocking, and species introduction to previously uninhabited stream reaches. None of the actions associated with this alternative involve the direct or indirect manipulation of species population presence or distribution in the analysis area. Therefore, as a result of the selection of the Action Alternative, no direct and indirect impacts to native bull trout, westslope cutthroat trout, or sculpin presence or distribution are expected in the Moose Creek analysis area.

Effects to channel forms in the fish-bearing reaches will be addressed by evaluating the collective potential impacts to sediment, flow regime, and large wood debris features. An increase in the proportion of fine substrates is an impact that would be expected to adversely affect

## FISHERIES ANALYSIS SUMMARY

FIGURE III-6 - MOOSE CREEK SECTION MAP



## FISHERIES ANALYSIS SUMMARY

channel forms. For example, short-term and long-term negligible or minor impacts to substrates comprising stream channel forms may occur as a result of adjacent riparian or upland harvesting near fish-bearing and contributing non-fish-bearing streams. However, the *HYDROLOGY ANALYSIS* has determined that no measurable or detectable increase in sediment to streams in the Moose Creek analysis areas would be expected as a result of the proposed action. The *HYDROLOGY ANALYSIS* has also determined that no measurable or detectable departure in flow regime to streams in the Moose Creek analysis area would be expected as a result of the proposed actions. An analysis of the proposed actions indicates that no riparian timber harvesting would occur. Upland timber harvesting would occur within 140 to 400 feet of fish-bearing streams, and the average distance of the proposed harvest unit boundaries to fish-bearing streams is approximately 200 feet. The zone of recruitable large woody debris to fish-bearing streams is expected to extend approximately 120 feet from fish-bearing streams. Consequently, no measurable or detectable adverse impacts to large woody debris are expected in fish-bearing streams. Considering potential effects to sediment, flow regime, and large woody debris recruitment, a low risk of very low impacts to channel forms is expected.

Although many different variables affect the natural fluctuations and ranges of stream temperatures (e.g. groundwater inflows, loss of flow, stream gradient, stream width to depth ratio, volume), stream shading is the variable that typically has the greatest effect on stream temperatures in headwater streams and is also the variable most likely affected by

management activities. For practical purposes, the zone of vegetation that is considered to have the greatest effect on stream shading in headwater streams in the project area is generally confined to the area within the average lateral extent of mature riparian vegetation; in this case, approximately 120 feet. Since the proposed actions do not involve the harvesting of any riparian vegetation, the proposed action is not expected to have an effect on stream shading. Consequently, a low risk of very low impacts to stream temperature is expected.

The proposed Action Alternative does not include any actions that would affect fisheries connectivity.

### **CUMULATIVE EFFECTS**

#### **• *Cumulative Effects of the No-Action Alternative to Fisheries***

No cumulative effects are expected to fisheries resources in the Mud Lake analysis area (see *EXISTING CONDITION*).

In the Moose Creek analysis area, other future-related actions that are considered part of cumulative impacts are a low risk of very low impacts associated with the Red Whale Timber Sale (USFS-administered lands) and occasional recreational fishing. In the Moose Creek analysis area, a low risk of very low cumulative effects is expected to occur as a result of implementing the No-Action Alternative.

#### **• *Cumulative Effects of the Action Alternative to Fisheries***

No cumulative effects are expected to fisheries resources in the Mud Lake analysis area (see *EXISTING CONDITION*).

In the Moose Creek analysis area, future related actions that are considered part of cumulative impacts are a low risk of very low

## **FISHERIES ANALYSIS SUMMARY**

impacts associated with the Red Whale Timber Sale (USFS-administered lands) and occasional recreational fishing.

In the Moose Creek analysis area, considering no impacts are anticipated to species presence or distribution, a low risk of very

low impacts to channel forms and stream temperature, no impacts to connectivity, and a low risk of very low impacts from future related actions, an overall low risk of very low cumulative impacts to native fisheries is expected to occur.

## ECONOMIC ANALYSIS

### METHODS

The economic analysis for the timber sale proposal will include estimates of costs, revenues, and returns; these estimates are intended for the relative comparison of alternatives and are not intended for use as absolute estimates of return. The stumpage value was estimated by subtracting operating costs from current delivered log prices, minus costs. Operating costs include estimated road development, logging, hauling, forest improvement (FI) payments, profit margins, and risk. The *MONTANA SAWLOG AND VENEER LOG PRICE REPORT*, based on July through September 2007 data, was used for estimating the delivered price of the logs. Stumpage prices from recent local sales were also considered as an indication of the current market.

Easements and access to DNRC ownership will view how the road cost-share program is calculated and the effects of having shared easements.

### EXISTING CONDITION

The following description of the Flathead County economy is from the *ROBERT-WEDGE POST-FIRE PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT, FLATHEAD NATIONAL FOREST GLACIER VIEW RANGER DISTRICT, FLATHEAD COUNTY, MONTANA, OCTOBER 2004*.

*The Bureau of Business and Economic Research (2004) at the University of Montana sectorized Bureau of Economic Analysis data, about 25 percent of labor income in the basic economy was attributed to wood products for Flathead County. Additional sectors of basic labor income in this analysis include: agriculture and related (5 percent), nonresident travel (11 percent), manufacturing (10 percent), federal government (14 percent), trade center (12 percent), and selected manufacturing (19 percent).*

*However, when the entire economy was sectorized using the Sonoran*

*Institute's Economic Profile System for Flathead County for 2004, the distribution of labor income and non labor income or total personal income among sectors markedly changes. Specifically, non-labor income (38 percent) and income earned in the service industry (36 percent) were dominant. Manufacturing, which includes woods products, was 10 percent, while agriculture (1 percent) was insignificant.*

Uncertainty exists in the stumpage market due to a number of factors. Privately owned housing starts in November 2007 were at a seasonally adjusted annual rate of 1,187,000. This is 3.7 percent below the revised October estimate of 1,232,000, and is 24.2 percent below the revised November 2006 rate of 1,565,000 (*U.S. CENSUS BUREAU AND THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, NOVEMBER 2007*). The Western Wood Products price index has dropped from \$403 (January 2006) per Mbf lumber scale to \$274 (December 2007) for Douglas fir-larch lumber prices (*Western Wood Products Association, January 8, 2008*). The demand for sawlogs for this region of the State were projected to be good to fair for the last part of 2007 (*MONTANA SAWLOG AND VENEER LOG PRICE REPORT*, based on July through September 2007 data). The average revenue collected (stumpage and FI) by DNRC has dropped from \$291 per thousand board feet (Mbf) in 2006 to \$237 per Mbf in 2007 (*Ziesak 2008*). The economy in general for the western part of the State has not had the same downturn as other parts of the country. These factors have resulted in stumpage prices dropping a bit as compared to the last year or so. The timber prices used in this analysis attempt to recognize the current market conditions at the time of this analysis.

## ECONOMIC ANALYSIS

### ALTERNATIVE EFFECTS TO ECONOMICS

#### DIRECT EFFECTS

- Direct Effects of the No-Action Alternative to Economics***

As displayed in TABLE III-6 - COSTS AND BENEFITS ASSOCIATED WITH THE PROJECT BY ALTERNATIVE, revenue from the project area would not be realized at this time.

Permanent access rights to State ownership would not change. DNRC would work to obtain temporary access.

- Direct Effects of the Action Alternative to Economics***

As displayed in TABLE III-6 - COSTS AND BENEFITS ASSOCIATED WITH THE PROJECT BY ALTERNATIVE, an estimated \$471,881 in revenue would be deposited into the Common School Trust and an estimated \$68,250 would be deposited into the FI account. Road development and maintenance costs would amount to approximately \$8,670. An estimated \$32,300, or \$190 per acre, would be spent from the FI budget to reduce fire hazards and prepare harvested areas for regeneration.

DNRC would purchase permanent road easements on approximately 5.8 miles of road through the Federal Road Cost-Share Program. The cost for road easement is based on the proportional amount of property accessed by those roads, the market value of the property within the right-of-way, and the current value of the road. Participating parties share in road maintenance. Acting parties are required to perform road maintenance proportional to their use; for example, DNRC would grade 1.33 miles of Moose Creek Road before and following timber harvesting.

#### INDIRECT EFFECTS

- Indirect Effects of the No-Action Alternative to Economics***

Local mills may not be able to substitute the potential loss of logs from this alternative due to the overall reduction in timber harvested from other landowners. School funding would not benefit from this alternative. The market value of DNRC ownership would not benefit from having permanent legal access. DNRC would have to acquire access (temporary or permanent) for any future activity.

**TABLE III-6 - COSTS AND BENEFITS ASSOCIATED WITH THE PROJECT BY ALTERNATIVE**

	ALTERNATIVES	
	NO-ACTION	ACTION
Estimated total harvest volume (MMbf)	0	2.5
Road development costs (\$/Mbf)		2.89
Estimated stumpage value (\$/Mbf)		157.29
Forest Improvement (FI) fee (\$/Mbf)		27.30
Estimated stumpage value, FI, and development cost (\$/Mbf)		187.48
Total timber dollar value based on estimated stumpage value, FI, and road-development value, multiplied by the estimated harvest volume.	0	468,709
Estimated stumpage value and FI (\$/Mbf)		184.79
Total revenue (\$) to the State (stumpage value and FI)	0	461,484
Total revenue (\$) to the Common Schools Trust (stumpage value)	0	393,234

## ECONOMIC ANALYSIS

- ***Indirect Effects of the Action Alternative to Economics***

Local loggers and mills would likely harvest and receive the logs from this project, thereby benefiting the industry and employment levels in this region. This alternative would provide some funding for the Common Schools trust. The market value of these DNRC-managed lands would increase due to increased access rights.

### **CUMULATIVE EFFECTS**

- ***Cumulative Effects of the No-Action Alternative to Economics***

DNRC has a statewide sustained-yield annual harvest goal of 53.2

MMbf. If this project were not sold, this volume could come from sales elsewhere; however, the timber may be from other areas and not benefit this region of the State. This forest area would again be available for harvesting considerations.

- ***Cumulative Effects of the Action Alternative to Economics***

This sale is planned to be a portion of the annual harvest of 53.2 MMbf of timber from Montana's forested trust lands, and other regions of the State would not benefit. The net revenue from this sale would contribute to the Common Schools Trust.





## WILDLIFE ANALYSIS

### INTRODUCTION

The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the project area. This includes the large carnivores often displaced by human disturbance, such as grizzly bears (*Ursus arctos*), gray wolves (*Canis lupus*), and wolverines (*Gulo gulo*). Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or are in decline due to the decline of these elements across the landscape. Within the vicinity of the project area, the forests are a mosaic of mature stands, which benefit species relying on mature forests, and regenerating forests, which benefit wildlife species that use early seral stages either exclusively or seasonally.

Over time, due to fire suppression, tree densities increased and shade-tolerant species, such as Douglas-fir and grand fir, have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade-tolerant tree species and/or closed-canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats. Past timber harvesting has likely reduced the quality and quantity of snags and coarse woody debris compared to historical conditions, reducing habitat for those wildlife species that require these components.

This analysis is designed to disclose the existing condition of the wildlife resources and display the anticipated effects that may result from each alternative of this proposal. During the initial

scoping, the following wildlife issues were identified from internal and external comments regarding the effects of the proposed timber harvesting:

- Concern was expressed that timber harvesting could reduce forested cover that could reduce the amount of mature forested habitats available to those species that rely upon these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and/or successfully reproduce.
- Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent upon these resources, which could alter their survival and/or reproductive ability.
- Concern was expressed that timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.
- Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.
- Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.

## WILDLIFE ANALYSIS

- Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.
- Concern was expressed that timber harvesting and associated activities could remove elk security habitat and increase elk vulnerability.

Additionally, several issues were not considered further because no effects were anticipated under either alternative. Several sensitive species of wildlife (bald eagles, black-backed woodpeckers, Coeur d'Alene salamander, Columbian sharp-tailed grouse, common loon, flammulated owl, harlequin duck, northern bog lemming, peregrine falcon, and Townsend's big-eared bat) were dropped from further consideration because suitable habitat does not occur within the project area or proposed activities would not affect their habitats. Additionally, no changes in the amount of roads, status of roads, or levels of human access on any of the roads would be anticipated with the cost-share component of the action alternative; thus, no effects to wildlife would be anticipated, and these will not be discussed further under either alternative.

### ANALYSIS AREA

In this section, the discussions will focus on 2 areas of different scale. The first will be the "project area", which consists of Section 16, T37N, R22W (Mud Lake Section) and Section 36, T36N, R22W (Moose Creek Section). These areas range from 3,800 to 4,400 feet in elevation on varying slopes. The second scale or the "analysis area" relates to the surrounding landscape for assessing cumulative effects. The scales of these analysis areas

vary according to the species being discussed, but generally approximate the size of the home range of the discussed species.

### ANALYSIS METHODS

DNRC attempts to promote biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on State lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a "fine-filter" approach for threatened, endangered, and sensitive species (ARM 36.11.406). The fine-filter approach focuses on a single species' habitat requirements.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, MNHP data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by any alternative.

## WILDLIFE ANALYSIS

### COARSE-FILTER ASSESSMENT

#### **MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY**

*Issue:* Concern was expressed that timber harvesting could reduce forested cover that could reduce the amount of mature forested habitats available to those species that rely upon these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and/or successfully reproduce.

#### **Existing Environment**

Mature and old stands are essential habitat for wildlife species associated with the late seral stages of forest stand development for all or some life requirements. A partial list of these species includes the pileated woodpecker (*Dryocopus pileatus*), American marten (*Martes americana*), brown creeper (*Certhia americana*), and winter wren (*Troglodytes troglodytes*). The project area currently contains approximately 69 acres of mature stands (100+ years in age) of reasonably closed canopy mixed-conifer stands. These stands are interspersed with a variety of western larch/Douglas-fir, lodgepole pine, and mixed-conifer stands of varying ages and stocking densities.

Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the presence of other animals that prosper in edge habitats.

Cumulative effects were analyzed on lands within one mile of the project area using field evaluations and aerial photograph interpretation. Factors considered within the

analysis area include the level of harvesting, amount of densely forested habitats, and connectivity. Considerable amounts of the analysis area appear to have been the result of the extensive fires 80 to 110 years ago. Thus, much of the area is of similar age and condition. Some harvesting and clearing for residential development has occurred on neighboring parcels. Open roads and human development have reduced some of the landscape-level connectivity; however, landscape connectivity has largely been retained and appreciable forested interior habitats exist in the analysis area.

#### **ALTERNATIVE EFFECTS TO FORESTED HABITATS AND LANDSCAPE CONNECTIVITY**

##### **Direct and Indirect Effects**

- ***Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity***

Forest stands would continue to mature and move toward denser stands of shade-tolerant tree species with high canopy cover. Largely, no appreciable changes to forest age, distribution of dense forested cover, mean patch size, or landscape connectivity would be anticipated. No changes in wildlife use would be expected; wildlife favoring denser stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. Habitat for forested interior species and old-stand-associated species, such as the American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative. Thus, no direct or indirect effects to mature forested

## WILDLIFE ANALYSIS

habitats and connectivity would be anticipated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity***

Approximately 576 acres of western larch, lodgepole pine, and mixed conifers would be harvested to varying degrees. As indicated in the vegetation analysis, no stands that meet the old-growth definition are included in the proposed units; however, roughly 9 acres proposed for harvesting under this alternative are mature (100+ years old). Much of the proposed activities are within younger-aged stands and nearly half of the acres are proposed for commercial thinning, which could promote mature stand characteristics more quickly than may have occurred without management. The other half of the acres are proposed to receive a regeneration-type treatment that would revert the stands to a younger age, which would reduce habitats for species that rely upon mature forested areas. Alterations and reductions in the near term would likely yield negligible long-term changes due to these offsetting changes. Some reductions in forested connectivity would be anticipated; however, connectivity would persist along riparian areas and untreated stands. The resultant changes in stand age and density would likely reduce habitats for species associated with older stands, such as the American marten and pileated woodpecker, which benefited from the increasing stand ages and densities caused by modern fire suppression. In general, under this alternative, habitat conditions would improve for species adapted to more-open forest conditions, while reducing habitat quality for species that prefer dense, mature forest

conditions. Thus, negligible direct or indirect effects on mature forested habitats and connectivity would be anticipated with this alternative.

### Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity***

Habitats in the vicinity are largely of similar age, originating after the extensive fires 80 to 100 years ago. Habitats for species requiring mature stands have gradually been improving. Past harvesting and residential clearing have reduced the amount of mature, forested habitats in the analysis area; additionally, ongoing harvests on private and USFS lands is further reducing mature, forested habitats. Under this alternative, the project area would continue contributing to the mature forested stands in the vicinity. No appreciable changes to the overall age or landscape connectivity would be anticipated. Continued use of the cumulative-effects analysis area by species favoring dense stands and those species requiring larger areas of mature forests would be expected. Habitat for forested-interior species and old-stand-associated species, such as the American marten, northern goshawk, and pileated woodpecker, would likely persist. Thus, no further cumulative effects to mature forested habitats and connectivity would be anticipated with this alternative.

- ***Cumulative Effects of the Action Alternative on Mature Forested Habitats and Connectivity***

Despite the general trend in the analysis area of conversion to mature forested habitats, past harvesting and clearing has reduced the amount of mature forested habitats, and ongoing

## WILDLIFE ANALYSIS

activities on private and USFS lands are further reducing these habitats. Reductions in mature forested habitats associated with this alternative would be additive to these other losses. Across the cumulative effects analysis area, considerable forested habitats would still exist and landscape connectivity would persist. Habitats for forested-interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would be reduced; however, some continued use of the cumulative-effects analysis area would be expected. Thus, negligible cumulative effects to mature forested habitats and connectivity would be anticipated with this alternative.

### **SNAGS AND COARSE WOODY DEBRIS**

*Issue:* Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent upon these resources, which could alter their survival and/or reproductive ability.

### **Existing Environment**

Snags and coarse woody debris are an important component of the forested ecosystems. Five primary functions of deadwood in the forested ecosystems are: 1) increase structural diversity, 2) alter canopy microenvironment, 3) promote biological diversity, 4) provide critical habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (*Parks and Shaw 1996*). Snags and defective trees (partially dead, spike top, broken top) are used by a wide variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife

species (*Heijl and Woods 1991*). The quantity, quality, and distribution of snags affect the presence and population size of many of the wildlife species utilizing these resources. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites for a variety of birds and mammals.

Coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food storage sites for several wildlife species. Small mammals, such as red-backed voles, to large mammals, such as black bears, rely on deadwood for survival and reproduction. The size, length, decay, and distribution of woody debris affect their capacity to meet these life requisites. Logs less than 6 feet in length tend to dry out and provide limited habitat for wildlife species. Single scattered downed trees could provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles provide foraging sites for weasels and denning sites for Canada lynx.

During field visits, 0 to 1 variably spaced larger snags per acre and differing quantities of coarse woody debris were observed in the project area. The snags and coarse woody debris in the project area exhibit the range of sizes and decay classes, ranging from small to large and sound to almost fully decayed.

Cumulative effects were analyzed on lands within 1 mile of the project area using field evaluations and aerial photograph interpretation. Factors considered within the analysis area include the amount of past timber harvesting, number of snags and coarse woody debris, and risk level of firewood harvesting. Considerable amounts of the analysis area appear to have been the result of the extensive fires 80 to 110 years ago. Thus, much of the area

## WILDLIFE ANALYSIS

is of similar age and stand condition, with limited past harvesting and/or large snags. Some harvesting and clearing for residential development has occurred on neighboring parcels, which further reduced snag and coarse woody debris levels. Some open roads in the analysis area have facilitated a collection of snags and coarse woody debris for firewood gathering in the vicinity in the past; however, the mortality due to the recent wildfires has likely increased the availability of firewood in the larger area.

### **Alternative Effects to Coarse Woody Debris**

#### ***Direct and Indirect Effects***

- ***Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris***

No direct changes in the deadwood resources would be expected. Snags would continue to provide wildlife habitats and new snags would be recruited as trees die. Coarse woody debris would persist without other disturbance influencing distribution and quality. Continued decay and decline in existing snags and trees would continue to contribute to the coarse woody debris resource. Thus, no direct or indirect effects to snags and coarse woody debris would be anticipated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris***

Present and future deadwood material could be reduced during timber harvesting. Several snags and snag recruits would be planned for retention within the proposed units; however, some of this material could be lost due to safety and operational concerns. Based on data collected by USFS on Lolo National Forest, an estimate of snag loss during harvesting

activities ranged from 50 to 100 percent (Hillis 1993). Recent DNRC monitoring indicates a similar loss of snags, with a greater percentage being lost in the medium size classes than other size classes. If firewood gathering is permitted, a further reduction in snags and coarse woody debris would be anticipated. Requirements to retain western larch snags and coarse woody debris would partially mitigate this loss. Future snag quality would be enhanced with silvicultural prescriptions that should increase vigor of existing shade-intolerant tree species. Some coarse woody debris may be lost with associated mechanized activities, and new coarse woody debris recruitment would be expected with the proposed activities. Thus, negligible direct or indirect effects to snags and coarse woody debris would be anticipated with this alternative.

#### ***Cumulative Effects***

- ***Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris***

Snags and coarse woody debris would not be altered in the project area. Existing snags would persist across much of the area, with some potential reduction associated with ongoing harvesting and clearing for human development. Some snags and snag recruits have been retained with recent harvesting on adjacent parcels; however, limited large snags exist in the analysis area largely due to the age of the stands and the perceived past fire intensity. Wildlife relying on snags and coarse woody debris would be expected to persist across the cumulative-effects analysis area. Thus, no further cumulative effects to snags and coarse woody debris would be anticipated with this alternative.

## WILDLIFE ANALYSIS

- ***Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris***

Some snags and coarse woody debris could be removed from the project area, while others may be recruited. Some snags and snag recruits have been retained with recent harvesting on adjacent parcels; however, limited large snags exist in the analysis area largely due to the age of the stands and the perceived past fire intensity. The losses of snags and coarse woody debris associated with this alternative would be additive to the losses associated with past harvesting and firewood gathering occurring in the cumulative-effects analysis area. Wildlife relying on snags and coarse woody debris are expected to persist across the cumulative effects analysis area at fairly similar levels to the present condition. Thus, negligible cumulative effects to snags and coarse woody debris would be anticipated with this alternative.

### FINE-FILTER ASSESSMENT

In the fine-filter analysis, individual species that are recognized to be of special concern are evaluated. These species are addressed below and include federally "threatened" or "endangered" species, species listed as "sensitive" by DNRC, and species managed as "big game" by DFWP.

#### THREATENED AND ENDANGERED SPECIES

In northwestern Montana, 3 terrestrial species are classified as "threatened" or "endangered" under the Endangered Species Act of 1973. The grizzly bear and Canada lynx are classified as "threatened," and the gray wolf is classified as "endangered".

- **Grizzly bear (*Ursus arctos*)**

*Issue:* Concern was expressed that timber harvesting and associated activities could alter cover, increase human access, and reduce

secure areas, which could adversely affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

#### Existing Environment

Grizzly bears are generalist omnivores that use a diversity of habitats found in western Montana. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or increasing human access to secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in increased risk of human-caused mortality by bringing humans and bears closer together. Displacing bears from preferred areas may increase their energetic costs, which may in turn lower their ability to survive and/or reproduce successfully.

The project area is within the North Continental Divide Ecosystem (NCDE) Recovery Area (U.S. Fish and Wildlife Service [USFWS] 1993) and grizzly bears are known to inhabit the project area. The project area falls within the Ketchikan, Lower Whale, and Red Meadow Moose bear management subunits (TABLE III-7 - ACRES OF GRIZZLY BEAR RECOVERY...). Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Within the project area, primary habitat components include big game winter range, meadows, and pockets of spring grizzly bear habitats mostly associated with riparian areas.



## WILDLIFE ANALYSIS

Managing human access is a major factor in management for grizzly bear habitat. Presently, 1.52 miles (0.40 mile in the Moose Creek Section and 1.12 miles in the Mud Lake Section) of open roads are in the project area (simple linear calculation for project area: 0.76 mile per square mile; for the Mud Lake Section, 1.12 miles per square mile; and the Moose Creek Section, 0.40 mile per square mile). DNRC is committed to designing projects to result in a no-net increase in the proportion of each subunit of a grizzly bear management unit (State trust lands only) that exceed an open-road density of 1 mile per square mile. Additionally, DNRC is committed to a no-net decrease in security core areas.

Cumulative effects were analyzed on the Ketchikan, Lower Whale,

and Red Meadow Moose grizzly bear management subunits. Factors considered within this analysis area include open-road densities (and associated human disturbance), amount of security habitat, and availability of hiding cover. The State of Montana (primarily DNRC) manages minor amounts (0.6 to 5.8 percent) of each of these subunits; the majority (76.8 to 91.2 percent) of each of these subunits is managed by USFS (TABLE III-8 - SECURITY CORE, OPEN ROAD DENSITIES, AND...). Private ownership is largely concentrated near the county road and the North Fork of the Flathead River, as well as a few other open roads. Within these lands, private residences and other developments are continuing to alter grizzly bear habitats and displace bears. Across the

**TABLE III-7 - ACRES GRIZZLY BEAR RECOVERY ZONE BEAR MANAGEMENT SUBUNITS BY LAND OWNERSHIP**

DNRC PARCEL	SUBUNIT	OWNERSHIP					TOTAL
		STATE (DNRC- MANAGED)	USFS	GLACIER NATIONAL PARK	PRIVATE	THE NATURE CONSERVANCY	
		ACRES					
Mud Lake	Ketchikan	1,121	18,395	232	4,161	53	23,963
Moose Creek	Lower Whale	1,096	15,559	191	2,131		18,978
Moose Creek	Red Meadow Moose	213	30,432	72	2,649		33,367

**TABLE III-8 - SECURITY CORE, OPEN ROAD DENSITIES, AND TOTAL ROAD DENSITIES WITHIN EACH OF THE BEAR MANAGEMENT SUBUNITS (see GLOSSARY)**

PARCEL	SUBUNIT	OPEN ROAD DENSITY	TOTAL ROAD DENSITY	SECURITY CORE
		PERCENT		
Mud Lake	Ketchikan <sup>1</sup>	19	3	68
Moose Creek	Lower Whale <sup>1</sup>	37	16	47
Moose Creek	Red Meadow Moose <sup>2</sup>	25	17	52

<sup>1</sup>Adapted from the Robert-Wedge Post-Fire Project EIS ROD.

<sup>2</sup>Adapted from the Red Whale Project EA.

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subunits, however, extensive hiding cover exists. Approximately 66 percent of the Lower Whale and 28 percent of the Ketchikan subunits burned with the Wedge Canyon Fire of 2003, reducing hiding cover on most of those acres. Previously, forest ages in the subunit were well distributed, but now are skewed toward the early seral stages. Proposed activities associated with the Red Whale Project could mechanically thin 927 to 3,583 acres and prescribe burn across 1,192 to 1,431 acres. This could reduce hiding cover while improving potential forage resources. Additionally, proposed measures could improve habitats by improving security habitats and potentially reducing open-road densities, depending on the selected alternative. In the Ketchikan Subunit, USFS activities associated with the Trail Fuels Reduction Project are altering roughly 1,350 acres (approximately 335 acres of mechanical thinning and 1,014 acres of prescribed burning), which is likely altering grizzly bear use of the area while removing some hiding cover, but is not expected to appreciably alter road densities, security habitat, and public access. Open-road densities, total-road densities, and security core vary within these subunits (*TABLE III-8 - SECURITY CORE, OPEN ROAD DENSITIES, AND...*); however, USFS standards (*AMENDMENT 19* and the subsequent modifications for the Lower Whale Subunit [*USFS Roberts-Wedge EIS 2004*]) are being met in the Ketchikan and Lower Whale subunits and, depending upon which alternative is selected with the Red Whale Project, these standards may be met in the Red Meadow Moose Subunit in the near future as well.

### Alternative Effects to Grizzly Bears

#### *Direct and Indirect Effects*

- ***Direct and Indirect Effects of the No-Action Alternative on Grizzly Bears***

No direct effects to grizzly bears would be expected. Displacement and disturbance would be similar to present conditions. No changes in security core, road densities, or hiding cover would be anticipated. Thus, no direct or indirect effects to grizzly bear habitats, security areas, or disturbance levels would be anticipated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Grizzly Bears***

Disturbance would increase due to harvesting and associated human access. This alternative could affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or move from the area. These disturbances would only be present during harvesting operations; thus, season of disturbance is important in addressing impacts to grizzly bears. Activities would be proposed for summer and fall when the probability of bears using the area is low, and reduced direct disturbance to grizzly bears would be anticipated. Additionally portions of the proposed project area are adjacent to open roads where existing disturbance has likely reduced habitat quality.

Timber harvesting may reduce the

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habitat quality within the proposed units. The project area occurs in spring grizzly bear habitat. The effects of timber harvesting on grizzly bears are not conclusive. Therefore, the effects of this particular project on spring habitat are difficult to speculate; however, they probably range from neutral to slightly negative. Forage production is anticipated to increase with harvesting and associated site preparation.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on most of the 576 acres with the proposed harvesting. Hiding cover is especially important along open roads and in areas that receive human disturbance. Increased sight distances through the units adjacent to open roads would increase grizzly bear disturbance levels. However, some hiding cover in the form of brush, shrubs, and submerchantable trees would be retained along open roads; hiding cover in the harvested units is expected to regenerate in 5 to 10 years. Security core would not be entered or altered with this alternative.

No permanent increase in open-road densities would occur. A temporary increase in open-road densities is permissible for 2 consecutive operating seasons, (ARM 36.11.433 (1)(a)); thus, any newly constructed roads could be used for 2 years or less and then closed to motorized traffic. Open-road densities (simple linear calculation) could increase up to 2.97 miles per square mile if all opened roads were in use during the same nondenning season. More than likely,

operations would focus on one section and open-road densities would be lower for most of the contract period. To accommodate the timing needs for the proposed logging, nutrient cycling, and site preparation all within this restriction of 2 consecutive operating seasons, proposed harvesting in the north portion of the Moose Creek Section would need to be completed in one operating season so that site preparation could occur the following operating season. Public motorized access to the State sections would remain unchanged. Thus, minor direct or indirect effects to grizzly bear disturbance levels, habitats, or security areas would be anticipated with this alternative.

### **Cumulative Effects**

- ***Cumulative Effects of the No-Action Alternative on Grizzly Bears***

Motorized access to the area, security habitat, and hiding cover would not change. In the long term, forest succession would continue and might reduce food sources, but may increase the amount of hiding cover in the subunit. Ongoing and proposed activities on USFS parcels would be expected to continue, which could disturb grizzly bears while altering their habitats. No other State actions are proposed within any of these subunits. Activities on private lands in the area are expected to continue disturbing bears and altering grizzly bear habitats. Long-term use of the subunits would be expected. Thus, no further cumulative effects would be anticipated with this alternative.

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- ***Cumulative Effects of the Action Alternative on Grizzly Bears***

Disturbance associated with this alternative would be additive to the disturbance and displacement associated with ongoing activities on USFS and private ownerships. The increased use of roads during the proposed project could temporarily increase human disturbance to grizzly bears within portions of each of the subunits. This would temporarily elevate open-road densities within each of these subunits for up to 2 consecutive years, which is permissible (ARM 36.11.433(1)(a)). Long-term open-road densities would not increase, with temporary increases elevating the densities and then reverting back to existing levels after completion of the proposed activities (TABLE III-8 - SECURITY CORE, OPEN ROAD DENSITIES, AND...). Reductions in hiding cover would be additive to the reductions due to past timber harvesting, the extensive wildfires in the recent past, and human developments. However, considerable hiding cover exists within all 3 subunits. Early successional stages of vegetation occurring in harvest units would provide foraging opportunities that do not exist in some mature stands. No changes in security core would be anticipated. Continued use of the subunits would be anticipated. Thus, minor further cumulative effects to grizzly bear habitats, security areas, or disturbance levels would be anticipated with this alternative.

- ***Gray wolf (*Canis lupus*)***

*Issue:* Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

### **Existing Environment**

Gray wolves are a wide-ranging, mobile species. Adequate habitat for wolves consists of areas with available prey and minimal human disturbance. Wolves prey primarily on white-tailed deer, and, to a lesser extent, elk and moose, in northwestern Montana (Kunkel et al. 1999). Typically, wolves in Montana den in late April. Wolves are most vulnerable to human disturbance at den and rendezvous sites. The combination of cover, human disturbance, and prey availability likely influence wolves.

The Kintla Wolf Pack uses an area east of the project area; the Moose Creek and Mud Lake sections are within 1 and 2 miles of the Kintla Wolf Pack home range, respectively. In previous years, the home range of this pack included parts of the project area. Wolves may be using the project area for hunting, breeding, and other life requirements. Wolf prey species and hiding cover are abundant within the project area. No known den or rendezvous sites are known in the vicinity; however, several landscape features frequently associated with these sites occur in the project area.

For several years, the Kintla Wolf Pack has used an elongated north-south home range averaging 50,806 acres and largely stayed on the east side of the North Fork Flathead River. Cumulative effects were analyzed on an area on the west side of the North Fork Flathead River that was of similar

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size (48,910 acres) and orientation and contained similar habitats. The analysis area was evaluated using field evaluations and a review of mapped habitats. Factors considered include available habitats and levels of human disturbance. Within the analysis area are some big game winter ranges, numerous meadows and other openings near water, and areas of gentle terrain. Moderate open-road densities, with roughly 0.94 mile per square mile (simple linear road calculation), likely affect wolf use of the area; however, extensive areas are without open roads where wolves can avoid humans. Within the analysis area, at least 106 miles of roads are closed, yielding a total road density of 2.32 miles per square mile (simple linear calculation). Within the home range, the majority of the lands are managed by USFS (81 percent), with smaller amounts of private (14 percent), DNR-managed lands (4 percent), and National Park (1 percent). Human disturbance in the analysis area that may be affecting wolves is largely associated with the open roads and seasonal residences in the area. Limited commercial harvesting and locally concentrated recreation could also affect wolves in the area. White-tailed deer, mule deer, elk, and moose use the analysis area during nonwinter periods; winter range for these species is largely limited in the analysis area, but some winter range exists along the North Fork Flathead River for white-tailed deer, mule deer, and elk, while winter range for moose occurs across much of the analysis area.

### Alternative Effects to Gray Wolves

#### *Direct and Indirect Effects*

- ***Direct and Indirect Effects of the No-Action Alternative on Gray Wolves***

Disturbance to wolves would not increase. No changes in white-tailed deer habitat would be expected in the short-term; therefore, no changes in wolf prey would be anticipated. Wolf use of the project area would be expected to continue at current levels. Thus, no direct or indirect effects to gray wolves would be expected as a result of this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Gray Wolves***

Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites. After harvesting activities, wolf use of the project area for denning and rendezvous sites would likely revert to preharvest levels. In the short term, the proposed harvest units would be expected to lead to a decrease in winter thermal cover and an increase in big game forage. The reduction in winter thermal cover could result in local decreases in abundance during the winter months, which could alter wolf use of the project area. Thus, negligible direct or indirect effects to gray wolves would be expected as a result of this alternative.

#### **Cumulative Effects**

- ***Cumulative Effects of the No-Action Alternative on Gray Wolves***

White-tailed deer winter range would not be affected, and substantive change in white-tailed deer population, distribution, or habitat use would be not anticipated. Levels of human disturbance

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would be expected to remain similar to present levels. Ongoing timber sales on private and USFS lands may cause shifts in white-tailed deer use and, subsequently, gray wolf use of the cumulative-effects analysis area; however, no changes would be anticipated that would alter levels of gray wolf use of the area. Thus, no further cumulative effects to gray wolves would be anticipated with this alternative.

- ***Cumulative Effects of the Action Alternative on Gray Wolves***

Since the expected effects of this project on wolves would be minor, cumulative effects would also be minor. Some slight shifts of big game use could occur. Reductions in cover could cause slight decreases in use by deer and elk; however, no appreciable changes would be expected within the cumulative-effects analysis area. Travel corridors along riparian areas and through unharvested stands would maintain connectivity with surrounding forested habitats. Reductions in cover within the project area would be additive to openings from past timber-harvesting activities and human developments. Ongoing projects on USFS lands would further contribute to these reductions and subsequent shifts in habitat use. Disturbances associated with this project would be additive to existing disturbance levels in the analysis area. Human-disturbance levels would be expected to revert to levels similar to current levels after the proposed harvesting has been completed and roads have been closed. Wolves could still use the analysis area after the proposed activities following minor shifts in habitat use. Thus, negligible cumulative effects to gray wolves would be

anticipated with this alternative.

- ***Canada lynx (*Lynx canadensis*)***

*Issue:* Concern was expressed that timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitat components leading to a decreased ability for the area to support lynx.

### **Existing Environment**

Canada lynx are associated with subalpine fir forests generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al., 2000). The project area ranges from approximately 3,480 to 4,400 feet in elevation and is dominated by lodgepole pine and mixed conifers, with some western larch and hardwoods. Lynx habitat in western Montana consists primarily of young coniferous forests with plentiful snowshoe hares, mature subalpine fir/Engelmann spruce stands with abundant coarse woody debris for denning and cover for kittens, and densely forested cover for travel and security. Additionally, the mature forests provide habitat for red squirrels, an alternative prey source for lynx. Historically, high intensity, stand-replacing fires of long fire intervals (40 to 200 years) within continuous forests of lodgepole pine, subalpine fir, and Engelmann spruce maintained a mosaic of ideal snowshoe hare and lynx habitat.

To assess lynx habitat, DNRC SLI data were used to map specific habitat classes used by lynx. Other parameters (stand age, canopy cover, amount of coarse woody debris) were used in modeling the availability of specific types of lynx habitat in the area (i.e. denning, forage, other, temporary not available).

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Approximately 1,169 acres of lynx habitat occur in the project area. Much of this habitat was identified as forested travel/other with some denning and lesser amounts of foraging and temporary not available habitats (TABLE III-9 - ACRES OF LYNX HABITATS IN THE PROJECT AREA BY THE THREE SUBUNITS...).

Cumulative effects were analyzed on the North Trail, Lower Whale, and Moose Lynx analysis units. Factors considered within each analysis area include the level of human disturbance; amount of the analysis area in denning, foraging, and unsuitable habitats; and landscape connectivity. Currently the North Trail Lynx Analysis Unit (LAU) is dominated by forested travel habitats, while the Lower Whale and Moose LAUs generally have equally distributed amounts of each of the lynx habitat types (TABLE III-10 - ACRES OF LYNX HABITATS BY ALTERNATIVE WITHIN EACH OF THE LAUs...). Human disturbance in the analysis areas is largely associated with the open roads and seasonal residences in the area. Limited commercial harvesting and locally concentrated recreation could also affect lynx in the area. Landscape connectivity within the LAUs is relatively high and is well connected from the Whitefish Range to Glacier National Park. Approximately 26 percent of the Lower Whale LAU and 5 percent of the North Trail LAU burned in the Wedge Canyon Fire of 2003. This did not alter connectivity appreciably in the North Trail LAU; however, in the Lower Whale LAU, this created a fairly sizeable patch of temporary non-lynx habitat in the middle portion of the LAU, which reduced connectivity in the near term.

### Alternative Effects to Canada Lynx

#### Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Canada Lynx***

Timber stands would continue to age and eventually start moving towards shade-tolerant tree species. The existing stands of continuous forested habitats could facilitate lynx movement. Habitats would persist in the project area, except for the maturation of some of the forested travel into some of the other suitable lynx habitat classes. Young foraging habitats would continue to be absent from the project area. Existing closed roads and skid trails would remain closed; no changes in human-disturbance levels would be expected. Thus, no direct or indirect effects to lynx would be anticipated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Canada Lynx***

Approximately 576 acres of lynx habitats would be harvested with this alternative. Of these acres, the majority are forested travel and denning habitats. After the proposed harvesting, part of the forested travel habitats would continue to function in that capacity, while the other part would be converted to temporary non-lynx habitats. Likewise, the denning habitats would largely be converted into temporary non-lynx habitats. Forest connectivity around the openings created with this alternative would largely be maintained through riparian buffers and other forested habitats in the project area not altered with this alternative. No appreciable changes to human access with recreational snowmobile use would be expected; therefore, no

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competition with lynx would be anticipated. Thus, minor direct or indirect effects to lynx

habitats and/or competition would be anticipated with this alternative.

**TABLE III-9 - ACRES OF LYNX HABITATS IN THE PROJECT AREA BY THE 3 SUBUNITS AND ANTICIPATED AMOUNTS OF EACH HABITAT AFTER EACH ALTERNATIVE**

	LAU	DENNING	FORAGING	FORESTED TRAVEL	TEMPORARY NON-LYNX HABITATS	TOTAL LYNX HABITATS
Existing Condition	North Trail	200	42	219	72	533
	Lower Whale	6	0	45	8	59
	Moose	140	47	389	0	576
No-Action Alternative	North Trail	200	42	219	72	533
	Lower Whale	6	0	45	8	59
	Moose	140	47	389	0	576
Action Alternative	North Trail	94	42	193	204	533
	Lower Whale	6	0	25	28	59
	Moose	55	38	257	226	576

**TABLE III-10 - ACRES OF LYNX HABITATS BY ALTERNATIVE WITHIN EACH OF THE LAUs AND THE PROPORTION EACH SUITABLE HABITAT REPRESENTS OUT OF ALL SUITABLE LYNX HABITATS**

	LAU	LYNX HABITATS				
		DENNING	FORAGING	FORESTED TRAVEL	TEMPORARY NON-LYNX HABITATS	TOTAL LYNX HABITATS
Existing Condition	North Trail <sup>1</sup>	4,572 15%	1,586 5%	22,055 74%	1,454 5%	29,667
	Lower Whale	6,973 34%	3,806 19%	4,850 24%	4,781 23%	20,410
	Moose <sup>2</sup>	3,722 <sup>3</sup> 28%	2,925 <sup>3</sup> 22%	5,318 <sup>3</sup> 40%	0 <sup>3</sup> 0%	13,294
No-Action Alternative	North Trail <sup>1</sup>	4,572 15%	1,586 5%	22,055 74%	1,454 5%	29,667
	Lower Whale <sup>1</sup>	6,973 34%	3,806 19%	4,850 24%	4,781 23%	20,410
	Moose <sup>2</sup>	3,722 <sup>3</sup> 28%	2,925 <sup>3</sup> 22%	5,318 <sup>3</sup> 40%	0 <sup>3</sup> 0%	13,294
Action Alternative	North Trail <sup>1</sup>	4,466 15%	1,586 5%	22,029 74%	1,586 5%	29,667
	Lower Whale <sup>1</sup>	6,973 34%	3,806 19%	4,830 24%	4,801 23%	20,410
	Moose <sup>2</sup>	3,722 <sup>3</sup> 27%	2,916 <sup>3</sup> 22%	5,318 <sup>3,4</sup> 40%	0 <sup>3,4</sup> 0%	13,294

<sup>1</sup> Adapted from the Robert-Wedge Post-Fire Project Final Environmental Impact Statement (FEIS)

<sup>2</sup> Adapted from the Red Whale Project EA

<sup>3</sup> No acres reported in the Red Whale Project EA, only percentages of the (LAU). Approximate acres calculated from the percentage.

<sup>4</sup> The Red Whale EA combined forested travel and temporary unsuitable habitats into one category.



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### **Cumulative Effects**

- ***Cumulative Effects of the No-Action Alternative on Canada Lynx***

Under this alternative, lynx habitats would not be affected in the near term. Within the cumulative effects analysis area, the mosaic of habitats would be expected to continue providing snowshoe hare habitats intermixed with mature forested stands that facilitate travel and foraging (TABLE III-10 - ACRES OF LYNX HABITATS BY ALTERNATIVE WITHIN EACH OF THE LAUs). Denning habitats would also persist in the cumulative-effects analysis area. In the future, stands that burned in the Wedge Canyon Fire of 2003 will gradually start providing young stands that are capable of supporting snowshoe hares and will be suitable foraging areas. Additionally, continued succession in the forested travel and temporary non-lynx habitats could move these stands into some of the other lynx habitat categories. Denning habitat would be expected to persist in the absence of timber harvesting or a catastrophic event reducing habitat quality. No further changes in the distribution of lynx habitat types would be anticipated. Ongoing harvesting associated with the Trail Fuels Reduction Project is expected to have minor effects to lynx and their habitats through conversion of up to 1,127 acres of lynx habitats (approximately 4 percent of the LAU area) into unsuitable habitats. Proposed activities associated with the Red Whale Project could alter 322 to 555 acres of lynx habitats within the Lower Whale LAU and 337 to 1,216 acres of lynx habitats in the Moose LAU, depending on the alternative selected. No further changes in

the amount of any LAU that are temporary non-lynx habitats would be expected. No changes in human access would be expected with this alternative; therefore, no changes in competition with lynx would be anticipated. No changes in existing landscape connectivity would be expected. Thus, no further cumulative effects to lynx would be anticipated with this alternative.

- ***Cumulative Effects of the Action Alternative on Canada Lynx***

Considerable lynx habitats would persist across the LAUs. Reductions, largely in forested travel and denning habitats, would not be expected to appreciably alter lynx use of the cumulative-effects analysis area. Following harvesting, sufficient denning and foraging habitats would persist to meet DNRC's requirements for these habitat attributes (ARM 36.11.435 (8)(a) and (c)). A negligible increase in the amount of temporary non-lynx habitat in each LAU would not appreciably alter lynx use of the subunit (TABLE III-10 - ACRES OF LYNX HABITATS BY ALTERNATIVE WITHIN EACH OF THE LAUs...). In the future, stands that burned in the Wedge Canyon Fire of 2003 will gradually start providing young stands that are capable of supporting snowshoe hares and be suitable foraging areas. Additionally, continued succession in the forested travel and temporary non-lynx habitats could move these stands into some of the other lynx habitat categories. Denning habitat would be expected to persist in the absence of timber harvesting or a catastrophic event reducing habitat quality. Ongoing harvesting associated with the Trail Fuels Reduction Project is

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expected to have minor effects to lynx and their habitats through conversion of up to 1,127 acres of lynx habitats (approximately 4 percent of the LAU area) into unsuitable habitats. Proposed activities associated with the Red Whale Project could alter 322 to 555 acres of lynx habitats within the Lower Whale LAU and 337 to 1,216 acres of lynx habitats in the Moose LAU, depending on the selected alternative. Disturbance and habitat reductions associated with the proposed project would be additive to these ongoing activities. No changes in human access at the analysis area level would be expected with this alternative; therefore, no changes in competition with lynx would be anticipated. Landscape connectivity would be retained through riparian buffers and unharvested stands. Changes in available habitats at the project level may concentrate lynx movements within the analysis area to some of these more defined areas. Overall, negligible cumulative effects to lynx would be anticipated under this alternative.

### ***SENSITIVE SPECIES***

When conducting forest-management activities, DNRC is required to give special consideration to habitat requirements of several sensitive species. These species are sensitive to human activities, have special habitat requirements that might be altered by timber management, or might become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met.

A search of the Montana Natural Heritage Database documented common loons, bald eagles, black-backed woodpeckers, and harlequin ducks in the vicinity of the project area. *TABLE III-11 - LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROPOSED PROJECT* shows how each sensitive species was either included in the following analysis or removed from further analysis because suitable habitat does not occur within the project area or proposed activities would not affect their required habitat components.

***TABLE III-11 - LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROPOSED PROJECT***

<b>SPECIES</b>	<b>DETERMINATION - BASIS</b>
Bald eagle	No further analysis conducted - The nearest known bald eagle nest is over 6 miles from the project area. Overall, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
Black-backed woodpecker	No further analysis conducted - No recently (less than 5 years) burned areas are in the project area. In the vicinity, the Wedge Canyon Fire of 2003 created extensive black-backed woodpecker habitats. Overall, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.

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SPECIES	DETERMINATION - BASIS
Coeur d'Alene salamander	No further analysis conducted - No moist talus or streamside talus habitats are known to occur in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse	No further analysis conducted - No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon	No further analysis conducted - No suitable lakes exist in the project area; however, loons have nested on Mud Lake in the past, which is over 0.25 miles outside of the project area. Thus, no direct, indirect, or cumulative effects to common loons would be expected to occur as a result of either alternative.
Fisher	<b>Included</b> - Potential fisher habitat occurs in the project area.
Flammulated owl	No further analysis conducted - No suitable dry ponderosa pine habitats occur within the project area. Thus, no direct, indirect, or cumulative effects to flammulated owls would be expected to occur as a result of either alternative.
Harlequin duck	No further analysis conducted - Although Moose Creek may contain areas of suitable high-gradient stream habitat, the creek is not known to support harlequin ducks. Harlequin ducks have been documented on Teepee Creek, which is between the Moose Creek and Mud Lake sections. Under either alternative, no activities are proposed that would occur closer than 200 feet of Moose Creek. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Northern bog lemming	No further analysis conducted - No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon	No further analysis conducted - No suitable cliffs occur within the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpecker	<b>Included</b> - Western larch, cottonwood, and mixed-conifer habitats occur in the project area.
Townsend's big-eared bat	No further analysis conducted - DNRC is unaware of any mines or caves within the project area or close vicinity that would be suitable for use by Townsend's big-eared bats. Thus, no direct, indirect, or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.

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### Sensitive Species Assessed

#### ► Fisher (*Martes pennanti*)

*Issue:* Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.

#### Existing Environment

Fishers are generalist predators that prey upon a variety of small mammals and birds, along with snowshoe hares and porcupines. Fishers use a variety of successional stages and are typically found below 6,000 feet in elevation. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and tend to use areas within 150 feet of water disproportionately more than their availability on the landscape (Jones 1991). Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept (Jones 1991). Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

The project area ranges from 3,480 to 4,400 feet in elevation, with approximately 2.6 miles of perennial streams and another 1.4 miles of intermittent streams. DNRC manages preferred fisher coverts within 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (State trust lands only) would be in the sawtimber size class in moderate to well-stocked density (ARM 36.11.440(1)(b)(i)). Approximately 80 acres are in the riparian areas within the project area along the 4 miles of Class 1 and 2 streams. Modeling fisher

habitats using SLI data generated an estimate of 399 acres of fisher foraging, resting, denning, and travel habitats in the upland and riparian areas (361 upland acres and 38 riparian acres) in the project area (Heinemeyer and Jones 1994). Within the riparian areas, all preferred fisher coverts are moderately or well-stocked and likely supports the structural features necessary for use as fisher resting and denning habitats in addition to serving as travel habitats and maintaining landscape connectivity.

Cumulative effects were analyzed on the same analysis area used in the gray wolf analysis utilizing field evaluations and mapping potential habitats. Factors considered within this analysis area include amount of suitable fisher habitats, landscape connectivity, and human access. Within the cumulative-effects analysis area, roughly 2,798 acres are within 100 feet of the 78 miles of Class 1 streams and 50 feet of the 84 miles of Class 2 streams. Within the riparian habitats, roughly 99.9 percent of the 43.6 acres (State trust lands only) in preferred fisher coverts are presently providing structural features necessary for use as fisher resting and denning habitats. This exceeds the 75-percent threshold established in ARM 36.11.440(1)(b)(i). Landscape connectivity within the cumulative-effects analysis area is largely intact, particularly along the numerous streams in the area. Human access to the analysis area is moderate to low, with an estimated 0.94 mile per square mile of open-road density (see Gray Wolf section).

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### Alternative Effects to Fishers

#### Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Fishers***

No effects to fishers would be expected under this alternative. Little change to the stands providing fisher denning and foraging habitats would be expected. Habitats that are conducive to fisher denning and travel may improve due to increased tree growth and canopy closure; however, foraging opportunities may decline due to the lack of diversity in habitat such as edge and younger age-class stands. Human disturbance and potential trapping mortality would expect to remain similar to current levels. Thus, no direct or indirect effects to fisher habitats would be anticipated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Fishers***

Approximately 4 of the 38 acres of riparian fisher habitats in the project area would be included in the proposed units. Within these areas, a minor reduction in cover could be realized, but given the limitations of harvesting in the SMZ area (SMZ law and Forest Management Rules), the proposed treatment (commercial thin), and the species to be removed (mostly lodgepole pine), adequate cover and structure should be present after the proposed activities to continue providing fisher habitats. Additionally, approximately 164 of the 324 acres of fisher foraging and resting habitats in the uplands within the project area would receive treatments that would likely yield stands moderately open and less likely to be used by foraging fisher. Overall, minor direct or

indirect effects to fisher habitats would be anticipated with this alternative.

#### Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative on Fishers***

Fisher denning and resting habitats would be retained. Suitable fisher foraging, denning, and resting habitats occur across the cumulative-effects analysis area. Ongoing harvesting on USFS and private ownerships are largely removing uplands that may be suitable fisher foraging and travel habitats. No further alterations to riparian habitats would occur with this alternative, and the percentage of the analysis area in preferred cover types meeting structural requirements for potential fisher use would not change from the current 99.9-percent level. Landscape connectivity within the cumulative-effects analysis area is largely intact, particularly along the numerous streams in the area. Road access within the cumulative-effects analysis area would not change; therefore, fisher vulnerability to trapping would remain unchanged. Thus, no further cumulative effects to fisher habitats and/or disturbance levels would be anticipated with this alternative.

- ***Cumulative Effects of the Action Alternative on Fishers***

Limited harvesting could occur on roughly 4 acres of riparian habitats, along with harvesting on 164 acres of upland foraging and travel habitats. This would be additive to the losses associated with past and present harvesting, losses due to extensive wildfires, and human developments in the area. Within the 4 acres of riparian

## WILDLIFE ANALYSIS

areas receiving treatment, the majority would be expected to meet habitat requirements after the proposed treatment; therefore, no appreciable changes in the amount of riparian fisher habitats would be anticipated, and the trust lands in the analysis area would continue to support extensive riparian fisher habitats and exceed the 75-percent threshold established with ARM 36.11.440 (1) (b) (i). Landscape connectivity within the cumulative-effects analysis area would be largely intact, and human disturbance and potential trapping mortality would remain relatively unchanged since no changes in access within the subunit would be realized. Thus, minor further cumulative effects to fisher habitats and/or disturbance levels would be anticipated with this alternative.

### ► Pileated woodpecker (*Dryocopus pileatus*)

**Issue:** Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.

#### **Existing Environment**

Pileated woodpeckers excavate some of the largest cavities of any woodpecker. The cavities are frequently used in subsequent years by many other species of birds and mammals. Preferred nest trees are western larch, ponderosa pine, black cottonwood, and quaking aspen, usually 20 inches dbh and larger. The feeding- and nesting-habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature

forests. Much of the area was affected by the extensive fires 80 to 110 years ago, which removed many of the large western larch in the area; however, several large snags and large, emergent western larch trees that survived the past fire cycle exist in the project area, which could be suitable nesting and foraging sites. Black cottonwood occurs within some of the riparian areas in the project area.

Potential pileated woodpecker nesting habitat was identified by locating 'old stands' in the SLI database with more than 100 square feet basal area per acre, more than 40 percent canopy cover, and below 5,000 feet in elevation. In the project area, no potential pileated woodpecker nesting habitats were identified; however, approximately 1,146 acres of sawtimber-sized stands exist in the project area that likely serve as foraging habitats. During field visits, several feeding sites and 0 to 1 larger snags per acre were observed in the project area.

Cumulative effects were analyzed on lands within 1 mile of the project area using a combination of field evaluation and aerial photograph interpretation. Factors considered included the degree of harvesting and the amount of continuous forest within the cumulative-effects analysis area. The majority of the area within the analysis area is forested (approximately 78 percent); however, most of the area is likely only marginally suitable for pileated woodpeckers. Some larger black cottonwood and western larch exist that could be suitable nesting sites; however, most of the stands in the analysis area are a result of the extensive fires 80 to 110 years ago and are younger than typically used for nesting, but may be suitable

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foraging habitats. Within the cumulative-effects analysis area, limited amounts of harvesting and clearing for residential development has occurred.

### **Alternative Effects to Pileated Woodpeckers**

#### ***Direct and Indirect Effects***

- ***Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers***

No direct effects would be anticipated with this alternative. Western larch would continue to grow and eventually die, providing nesting and foraging habitats. A gradual conversion to shade-tolerant species could occur, which would reduce the quality for pileated woodpeckers. Thus, negligible direct or indirect effects to pileated woodpecker habitats and/or disturbance levels would be anticipated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers***

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by the proposed harvesting. Elements of the forest structure important for nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Since nesting habitats are absent, no immediate changes to these attributes would occur. Commercial-thinning prescriptions that would maintain and promote western larch while providing some canopy closure on approximately 314 acres could facilitate pileated woodpecker use into the future. A regeneration/overstory removal harvest on roughly 262 acres would remove

large amounts of timber in the midstory and overstory and largely leave the area too open to be considered pileated woodpecker habitats. These would be additive to the 106 acres that have been harvested in the project area in the last 25 to 35 years. Silvicultural treatments designed to recruit shade-intolerant tree species would benefit pileated woodpeckers in the distant future by providing nesting, roosting, and foraging habitats. Thus, moderate direct and indirect effects to pileated woodpecker habitats and/or disturbance levels would be anticipated under this alternative.

#### ***Cumulative Effects***

- ***Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers***

Continued maturation in the western larch could continue to provide foraging habitats while improving future nesting habitat conditions. Through time, some conversion of the stands to shade-tolerant species could reduce nesting substrates for pileated woodpeckers. No changes to existing pileated woodpecker habitats would occur, and continued pileated woodpecker use would be anticipated. Thus, no further cumulative effects to pileated woodpeckers would be anticipated under this alternative.

- ***Cumulative Effects of the Action Alternative on Pileated Woodpeckers***

Some reductions in pileated woodpecker foraging and, to a lesser degree, nesting habitats would occur. Snags, coarse woody debris, and some potential nesting trees would be retained within the project area. Within the project area, canopy on most of the 576 acres proposed for harvesting would likely be too

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open for appreciable pileated woodpecker use; however, some foraging may occur in the 314 acres proposed for a commercial-thinning treatment. Recently thinned stands and cleared residential lots have reduced some of the pileated woodpecker habitats in the area. The loss of pileated woodpecker habitats associated with the proposed harvesting would be additive to these past habitat losses. Additionally, continued maturation of stands across the area is increasing suitable pileated woodpecker habitats. Continued use of the analysis area by pileated woodpeckers would be anticipated, albeit at a reduced rate. Thus, minor cumulative effects to pileated woodpecker habitats and/or disturbance levels would be anticipated under this alternative.

### ELK SECURITY

*Issue:* Concern was expressed that timber harvesting and associated activities could remove elk-security habitat and increase elk vulnerability.

### EXISTING ENVIRONMENT

Timber harvesting can increase elk vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al., 1991). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and subsequent decrease in hunter opportunity. The presence of fewer

males at the beginning of the hunting season reduces the odds of any given hunter to see or harvest such an animal throughout the remainder of the season.

Several factors contribute to effective elk security cover, including being more than 0.5 mile from an open road, having adequate cover and terrain, being large enough so elk can move around, and having the least amount of edge habitats (Hillis et al., 1991). Within the project area, no patches meet the distance, cover, and size requirements to serve as elk security. However, a portion on the eastern edge of the Mud Lake Section may contribute to a larger patch of security habitat that continues onto adjacent USFS lands and Glacier National Park.

Cumulative effects to elk security were analyzed on Hunting District 110 (519,919 acres) using a combination of field evaluations and aerial photograph interpretation. Factors considered within this cumulative-effects analysis area include amount of security habitat and level of human access for recreational hunting. Within the district, moderate road access exists; however, past concerns regarding grizzly bear habitats has led to the closure of many roads in the district in the past. Within the district, approximately 179,357 acres (34.5 percent of the district) appear to be security cover for elk. However, nearly 17,417 acres burned with the recent Moose (2001), Robert (2003), and Wedge Canyon (2003) wildfires, which likely altered some of the security habitat; however, appreciable amounts of the security habitat in these burns likely still provide security habitat, but potentially at a slightly reduced level. Despite extensive security habitat, hunter access to the district is moderate, with at least 1 open road to most of the major drainages and considerable foot



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access along trails and closed roads.

### **ALTERNATIVE EFFECTS TO ELK SECURITY**

#### **Direct and Indirect Effects**

- ***Direct and Indirect Effects of the No-Action Alternative on Elk Security***

No changes in elk security cover would be expected; security habitat would continue to be absent from the project area. Existing cover would continue to serve as hiding cover. Timber stands would continue advancing to climax plant species. No alterations in cover would occur that would increase elk vulnerability during the hunting season. No changes would be anticipated in disturbance and potential mortality due to hunting. Thus, there would be no direct or indirect effects to elk security habitat and/or elk vulnerability as a result of this alternative.

- ***Direct and Indirect Effects of the Action Alternative on Elk Security***

No changes in elk security cover would be expected since security cover does not exist completely within the project area. Any restricted or temporary roads opened with the project would restrict public access with a sign during active periods and with a physical closure during inactive periods (weekends, breakup, etc.), when feasible. Thus, minimal changes in elk security or hunter access would be anticipated with these stipulations. No units are proposed within the portion of the Mud Lake Section that may be contributing to security habitat on adjacent lands. The retention of pockets of cover and structure within the proposed units would further contribute to big game security. Thus, negligible direct and indirect effects to elk security habitat and/or elk

vulnerability would be expected as a result of this alternative.

#### **Cumulative Effects**

- ***Cumulative Effects of the No-Action Alternative on Elk Security***

No changes would be anticipated in elk security cover; approximately 34.5 percent of the district would continue providing security habitat that would benefit elk and deer that spend portions of hunting seasons in the vicinity of the project area. Past harvesting, extensive habitat alterations due to several recent wildfires, and human developments have reduced elk security habitats while increasing human access. Existing security habitat would largely persist, and ongoing reductions in hiding cover associated with timber sales and human development would continue. Recently harvested or burned stands within the hunting district would likely provide additional hiding cover in 10 to 20 years. Thus, no cumulative effects to elk security habitat and/or elk vulnerability would be expected as a result of this alternative.

- ***Cumulative Effects of the Action Alternative on Elk Security***

Negligible impacts to big game survival would be anticipated. No changes in elk security cover would be expected under this alternative; security habitat would persist over roughly 34.5 percent of the hunting district. The reduction in hiding cover associated with the proposed harvesting would be additive to the reductions in hiding cover due to past harvesting, recent wildfires, and ongoing human development. Closing the roads that would be opened during harvesting activities and returning human disturbance to preharvest levels would compensate for some of the reduced elk hiding cover caused by the harvesting.

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Recently harvested or burned stands would likely contribute to security habitat in 10 to 20 years. Thus, negligible cumulative effects to elk security habitat and/or elk vulnerability would be expected as a result of this alternative.

## APPENDIX A - REFERENCES

- Bull, E. L. and J. A. Jackson. 1995. *Pileated woodpecker: Dryocopus pileatus*. American Ornithologists' Union. Washington, DC. 24pp.
- Bureau of Business and Economic Research. 2004. Outlook Montana Business Quarterly. The University of Montana, Missoula, MT.
- Farns, P. 1978. *Hydrology of Mountain Watersheds, Preliminary Report*. Soil Conservation Service. Bozeman, MT.
- Flathead National Forest Land Types. Interpretations taken from: Martinson and Basko, 1998. *Soil Survey of Flathead National Forest Area, Montana*. USDA forest Service.
- Haupt, H.F., et al. 1974. *Forest Hydrology Part II Hydrologic Effects of Vegetation Manipulation*. USDA Forest Service, Region 1. Missoula, MT.
- Heijl, S. J. and R. E. Woods. 1991. *Bird Assemblages in Old-Growth and Rotation-Aged Douglas-Fir/Ponderosa Pine Stands in the Northern Rocky Mountains: A Preliminary Assessment*. Pages 93-100 in D. M. Baumgartner and J. E. Lotan, eds. Proc. Symposium: Interior Douglas-fir: The Species and Its Management. Washington State University, Pullman, WA. 306pp.
- Heinemeyer, K. S. and J. L. Jones. 1994. *Fisher Biology and Management in the Western United States: A Literature Review and Adaptive Management Strategy*. USDA Forest Service, Northern Region, Missoula, MT. 108pp.
- Hillis, M. 1993. *Lolo National Forest Snag Monitoring: Methodology, Results, and Long-Term Concerns with Snag Protection*. Paper presented at the 1993 Region 1 Fish and Wildlife Congress.
- Hillis, J.M., and M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.W. McCleerey. 1991. *Defining Elk Security: The Hillis Paradigm*. Pages 38-43 in A.G. Christensen, L.J. Lyon, and T.N. Lonner, comps., Proc. Elk Vulnerability Symposium, Montana State University, Bozeman, MT. 330pp.
- Jones, J.L. 1991. *Habitat Use of Fisher in North-Central Idaho*. M.S. Thesis, University of Idaho, Moscow, ID. 147 pp.
- Kunkel, K, T., K. Ruth, D.H. Pletscher, and M.G. Hornocker. 1999. *Winter Prey Selection by Wolves and Cougars In and Near Glacier National Park, Montana*. Journal of Wildlife Management. 63:901-910.
- Leaf, Charles F. 1975. *Watershed Management in the Rocky Mountain Subalpine Zone: The Status of Our Knowledge*. Research paper RM137. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. Ft. Collins, CO.
- Mace, R.D. and J.S. Waller. 1997. *Final Report: Grizzly Bear Ecology in the Swan Mountains, Montana*. Montana Fish, Wildlife and Parks, Helena, MT. 191pp.
- Mace, R.D., J.S. Waller, T.L. Manley, L.J. Lyon, H. Zuuring. 1997. *Relationships among Grizzly Bears, Roads, and Habitat in the Swan Mountains, Montana*. Pages 64-80 in Mace, R.D. and J.S. Waller. 1997. *Final Report: Grizzly Bear Ecology in the Swan Mountains, Montana*. Montana Fish, Wildlife and Parks, Helena, MT. 191pp.
- MFISH (Montana Fisheries Information System). 2007. Montana Fish, Wildlife and Parks, Montana Natural Resource Information System.

Montana Department of Natural Resources. 2007. *Duck-to-Dog Timber Sale Environmental Assessment*. Stillwater State Forest. Olney, MT.

Montana Department of Natural Resources. 2007. *Shorts Meadow/Evers Creek Timber Sale Environmental Assessment*. Stillwater State Forest. Olney, MT.

Montana Department of Natural Resources. 2008. *Chicken-Antice Timber Sale Draft Environmental Assessment*. Stillwater State Forest. Olney, MT.

Parks, C.G. and D.C. Shaw. 1996. *Death and Decay: A Vital Part of Living Canopies*. Northwest Science. Volume 70, special issue: 46-53.

Pierce, John. 2007. Personal communication. Botanist.

Rosgen, David L. 1996. *Applied River Morphology*. Wildland Hydrology, Pagosa Springs, Co.

Ruediger, B., J. Claar, S. Mighton, B. Nanaey, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, S. Gniadek. 2000. *Canada Lynx Conservation Assessment (2nd Edition)*. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT. 122 pp.

Sonoran Institute's Economic Profile System County and Regional Data from 1970 to 2000 for the West (Sources: REIS, Census, BLS, and CBP).

Troendle, Charles A. 1987. *The Potential Effect of Partial Cutting and Thinning Streamflow from the Subalpine Forest*. Rocky Mountain Forest and Range Experiment Station.

U.S. Census Bureau and the Department of Housing and Urban Development, November 2007 <http://online.wsj.com/public/resources/documents/bbstart.pdf>

USDA Forest Service. 1998. *"Watershed" Condition-Rating Standards for form KNF-270-BT1 thru BT5*. Kootenai National Forest.

USDA Forest Service. 2006. *Trails Fuels Reduction Project Decision Memo*. Kalispell, MT.

USDA Forest Service. 2007. *Red Whale Project Environmental Assessment*. Hungry Horse, MT.

USFWS. 1993. *Grizzly Bear Recovery Plan*. Missoula, MT. 181pp.

Robert-Wedge Post-Fire Project Final Environmental Impact Statement. October 2004. Flathead National Forest, Glacier View Ranger District, Flathead County, MT. [http://www.fs.fed.us/rl/flathead/nepa/robert\\_wedge/feis/](http://www.fs.fed.us/rl/flathead/nepa/robert_wedge/feis/)

Ziesak, Roger. Personal Communication. 2008. Forest Operation Supervisor, Forest Management Bureau, Montana Department of Natural Resource and Conservation, Missoula, MT.

## **APPENDIX B**

### **STIPULATIONS AND SPECIFICATIONS**

Stipulations and specifications for the Action Alternative include project design provisions that follow Forest Management Rules and relevant laws and regulations. They also include mitigations that were designed to avoid or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by, and occurring during the contract period, would be contained within the Timber Sale Contract. As such, they are binding and enforceable. Project administrators would enforce stipulations and specifications relating to activities such as hazard reduction, site preparation, and planting that may occur during or after the contract period.

The following stipulations and specifications would be incorporated into the selected action alternative to mitigate potential effects of resources.

#### **AIR QUALITY**

- To minimize or cumulative effects during burning operations, burning would be done in compliance with the Montana Airshed Group reporting regulations and any burning restrictions imposed in Airshed 2. This would provide for burning during acceptable ventilation and dispersion conditions.
- Dozer, excavator, landing, and roadwork debris would be piled clean to allow ignition during fall and spring when ventilation

is good and surrounding fuels are wet. The Forest Officer may require that piles be covered so are drier, ignite easier, burn hotter, and extinguish sooner.

- In order to reduce smoke production, large woody debris would be left on site to minimize the number of burn piles.
- Dust abatement may be applied on some road segments, depending on the seasonal conditions and level of public traffic. Due to proximity of residences and private property, the Forest Officer may require numerous abatement applications on both the Moose Creek road and the Easement road, which would access the north side of the Moose Creek section.

#### **AESTHETICS**

- Damaged residual vegetation would be slashed.
- The size and number of landings would be limited.
- Disturbed soil sites along road right-of-ways would be grass seeded.
- Landings would be located away from Moose Creek Road and the North Fork Road.

#### **ARCHAEOLOGY**

- A contract clause provides for suspending operations if cultural resources were discovered; operations may only resume as directed by the Forest Officer.
- If cultural resources were discovered, the Confederated Salish-Kootenai Tribe has requested notification.

## **FISHERIES**

- Apply all applicable Forestry Best Management Practices (BMPs), including the SMZ Law and Rules, and Forest Management Administrative Rules for fisheries, soils, and wetland riparian management zones (ARMS 36.11.425 and 36.11.426).
- Apply the SMZ Law and Rules to all non-fish-bearing streams and lakes.
- Monitor all road-stream crossings for sedimentation and deterioration of road prism.
- Only allow equipment traffic at road-stream crossings when road prisms have adequate load-bearing capacity.

## **NOXIOUS WEED MANAGEMENT**

- All tracked and wheeled equipment would be cleaned of noxious weeds prior to beginning project operations. The contract-administrating officer would inspect equipment periodically during project implementation.
- Prompt vegetation seeding (with a native grass seed mix) of disturbed roadside sites would be required. Roads used and closed as part of this proposal would be reshaped and reseeded.

## **SOILS**

### **➤ SOIL COMPACTION AND DISPLACEMENT**

- Logging equipment would not operate off forest roads unless:
  - soil moisture is less than 20 percent,
  - soil is frozen to a depth that would support machine operations, or
  - soil is snow covered to a depth that would prevent compaction, rutting, or displacement.
- Existing skid trails and landings would be used where

their design is consistent with prescribed treatments and meets current BMP guidelines.

- To reduce the number of skid trails and the potential for erosion, designated skid trails would be required where moist soils or short steep pitches (less than 300 feet) would not be accessed by other logging systems.
- Skid trail density in a harvest area would not exceed 20 percent of the total area in a cutting unit.
- Conventional ground-based skidding equipment would not be operated on steep slopes (greater than 40 percent). Soft-tracked yarders are suitable on slopes up to 55 percent with less impact than conventional tractor skidding. Cable yarding would be used on steeper slopes.
- Piling and scarification would be completed with a dozer where slopes are gentle enough to permit. Steeper slopes would have slash treatment and site preparation done with an excavator.
- A majority of all feasible fine litter and 10 to 15 tons of large woody debris would be retained following harvesting (ARM 36.11.410 and 36.11.414).

### **➤ EROSION**

- Ground-skidding machinery would be required to be equipped with winchline to limit equipment operations on steeper slopes.
- Roads used by the purchaser would be reshaped and the ditches redefined following use to reduce surface erosion.
- Drain dips and gravel would be installed on roads as needed to improve road drainage and reduce maintenance needs and erosion.

- Some road sections would be repaired to upgrade the roads to design standards that reduce erosion potential and maintenance needs.
- Certified weed-free grass seed and fertilizer would be applied in a prompt and timely manner to all newly constructed road surfaces, cutslopes, and fillslopes. These applications would also be applied to any existing disturbed cutslopes, fillslopes, and landings immediately adjacent to open roads. Seeding to stabilize soils and reduce or prevent the establishment of noxious weeds would include:
  - seeding all road cuts and fills concurrent with construction,
  - applying "quick-cover" seed mix within 1 day of work completion at culvert installation sites involving stream crossings, and
  - seeding all road surfaces and reseeding culvert installation sites when the final blading is completed for each specified road segment.
- Based on ground and weather conditions, water bars, logging-slash barriers, and, in some cases, temporary culverts would be installed on skid trails where erosion is anticipated and as directed by the forest officer. These erosion-control features would be periodically inspected and maintained throughout the contract period or extensions thereof.

## **VEGETATION**

### **➤ SNAG RETENTION**

- In all harvest areas, all dead larch tress, 12.0" dbh and larger, would be retained as wildlife trees. Most live cull larch and Douglas-fir would be retained as wildlife trees. In

the Moose Creek section, all live larch greater than 11.0" dbh will be retained, some of which will function as live recruitment trees. In the Mud Lake section, the largest live larch trees were retained as crop trees, some of which will function as live recruitment trees. All hardwood trees, Aspen and Black cottonwood, would also be retained.

## **WATERSHED**

- Planned erosion-control measures include:
  - grade breaks on roads,
  - surface water-diverting mechanisms on roads,
  - slash-filter windrows, and
  - grass seeding.
- Details for these control measures would be included in *ATTACHMENT B* of the *TIMBER SALE AGREEMENT*.
- Streamside Management Zones and Riparian Management Zones would be defined along those streams and/or wetlands where they occur within or adjacent to harvest areas. This project would meet or exceed SMZ and RMZ rules.
- Brush would be removed from existing road prisms to allow for effective road maintenance. Road maintenance would reduce sediment delivery.
- The contractor would be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.,) that may affect water quality.
- Leaking equipment would not be permitted to operate at stream-crossing construction sites.
- The BMP audit process would continue. This sale would likely be reviewed in an internal audit and may be picked at random as a State-wide audit site.

## **WILDLIFE**

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with managing threatened and endangered species (ARM 36.11.428 through 36.11.435).
- Minimize disturbances to grizzly bear habitats by avoiding the spring period (April 1 - June 30) when grizzly bears are most likely to be in the vicinity.
- Minimize grizzly bear disturbance by limiting use of roads opened with the proposed activities to 2 consecutive operating seasons according to ARM 36.11.433(1)(a). Harvesting in the north portion of the Moose Creek Section would need to be completed in one operating season so that site preparation could occur the following season prior to closing the road.
- Limit access routes in the southern portion of the Moose Creek Section and to the east of the North Fork county road in the Mud Lake Section to less than 500 feet in length.
- Reclose roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use.
- Restrict public access at all times on restricted roads opened with the proposed activities.
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads.
- Retain forested corridors to maintain landscape connectivity and patches of dense vegetation, when possible, to provide security cover.
- Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411 through 36.11.414, particularly favoring western larch. Prohibit removal of western larch snags over 12 inches dbh for firewood.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads.



## **APPENDIX C**

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## APPENDIX D - GLOSSARY

### **Administrative road use**

Road use that is restricted to DNRC personnel and contractors or for purposes such as monitoring, forest improvement, fire control, hazard reduction, etc.

### **Airshed**

An area defined by a certain set of air conditions; typically, a mountain valley in which air movement is constrained by natural conditions such as topography.

### **Alternative effects**

The impacts or effects of the alternatives within a project on the natural and human environment.

### **Appropriate conditions**

The set of forest conditions determined by DNRC to best meet the SFLMP objectives. The 4 main components useful for describing an appropriate mix of conditions are covertype proportions, age class distributions, stand structural characteristics, and the spatial relationships of stands (size, shape, location, etc.), all assessed across the landscape.

### **Bald eagle primary-use area**

An area where it is assumed that 75 percent of the foraging, resting, and associated behaviors occur.

### **Basal area**

A measure of the number of square feet of space occupied by the stem of a tree.

### **Best Management Practices (BMPs)**

Guidelines to direct forest activities, such as logging and road construction, for the protection of soils and water quality.

### **Biodiversity**

The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

### **Board foot**

144 cubic inches of wood that is equivalent to a piece of lumber 1 inch thick by 1 foot wide by 1 foot long.

### **Canopy**

The upper level of a forest consisting of branches and leaves of the taller trees.

### **Canopy closure**

The percentage of a given area covered by the crowns, or canopies, of trees.

### **Cavity**

A hollow excavated in trees by birds or other animals. Cavities are used for roosting and reproduction by many birds and mammals.

### **Coarse down woody material**

Dead trees within a forest stand that have fallen and begun decomposing on the forest floor.

### **Coarse-filter**

An approach that supports diverse wildlife habitat by managing for a variety of forest structures and compositions instead of focusing on habitat needs for individual species.

### **Co-dominant tree**

A tree that extends its crown into the canopy, receiving direct sunlight from above and limited sunlight on its sides. One or more sides are crowded by the crowns of other trees.

### **Compaction**

Increased soil density caused by force exerted at the soil surface, modifying aeration and nutrient availability.

### **Connectivity**

The quality, extent, or state of being joined; unity; the opposite of fragmentation.

**Cover**

See *Hiding cover* and/or *Thermal cover*.

**Coverttype**

A classification of timber stands based on the percentage of tree species composition.

**Crown cover or crown closure**

The percentage of a given area covered by the crowns of trees

**Crown scorch**

The portion of the tree crown that has been scorched.

**Cull**

A tree of such poor quality that it has no merchantable value in terms of the product being cut.

**Cutting units**

Areas of timber proposed for harvesting.

**Cumulative effect**

The impact on the environment that results from the incremental impact of the action when added to other actions. Cumulative impacts can also result from individually minor actions, but collectively they may compound the effect of the actions.

**Direct effect**

Effects on the environment that occur at the same time and place as the initial cause or action.

**Ditch relief**

A method of draining water from roads using ditches and corrugated metal pipe. The pipe is placed just under the surface of the road.

**Dominant tree**

Those trees within a forest stand that extend their crowns above surrounding trees and capture sunlight from above and around the crown.

**Drain dip**

A graded depression built into a road to divert water and prevent soil erosion.

**Ecosystem**

An interacting system of living organisms and the land and water

that make up their environment; the home place of all living things, including humans.

**Equivalent clearcut acres (ECA)**

This method equates area harvested and percent of crown removed with an equivalent amount of clearcut area.

- *Allowable ECA* - The estimated number of acres that can be clearcut before stream channel stability is affected.
- *Existing ECA* - The number of acres that have been previously harvested, taking into account the degree of hydrologic recovery that has occurred due to revegetation.
- *Remaining ECA* - The calculated amount of harvesting that may occur without substantially increasing the risk of causing detrimental effects to the stability of the stream channel.

**Excavator piling**

The piling of logging residue using an excavator.

**Fire regimes**

Describes the frequency, type, and severity of wildfires. Examples include: frequent nonlethal underburns; mixed-severity fires; and stand-replacement or lethal burns.

**Forage**

All browse and nonwoody plants available to wildlife for grazing.

**Forest improvement**

The establishment and growing of trees after a site has been harvested. Associated activities include:

- site preparation, planting, survival checks, regeneration surveys, and stand thinnings;
- road maintenance;
- resource monitoring;
- noxious-weed management; and
- right-of-way acquisition on a State forest.

**Fragmentation (forest)**

A reduction of connectivity and an increase in sharp stand edges

resulting when large contiguous areas of forest with similar age and structural character are interrupted through disturbance (stand-replacement fire, timber harvesting, etc.)

**Habitat**

The place where a plant or animal naturally or normally lives and grows.

**Habitat type**

The place or type of site where a plant or animal naturally or normally lives and grows.

**Hazard reduction**

The reduction of fire hazard by processing logging residue with methods such as separation, removal, scattering, lopping, crushing, piling and burning, broadcast burning, burying, and chipping.

**Hiding cover**

Vegetation capable of hiding some specified portion of a standing adult mammal from human view at a distance of 200 feet.

**Historical forest condition**

The condition of the forest prior to settlement by Europeans.

**Homogeneous**

Of uniform structure or composition throughout.

**Indirect Effects**

Secondary effects that occur in locations other than the initial action or significantly later in time.

**Intermediate trees**

A characteristic of certain tree species that allows them to survive in relatively low light conditions, although they may not thrive.

**Interdisciplinary team (ID Team)**

A team of resource specialists brought together to analyze the effects of a project on the environment.

**Landscape**

An area of land with interacting ecosystems.

**Meter**

A measurement equaling 39.37 inches.

**Mitigation measure**

An action or policy designed to reduce or prevent detrimental effects.

**Multistoried stands**

Timber stands with 2 or more distinct stories.

**Nest site area (bald eagle)**

The area in which human activity or development may stimulate abandonment of the breeding area, affect successful completion of the nesting cycle, or reduce productivity. It is either mapped for a specific nest based on field data, or, if that is impossible, it is defined as the area within a 1/4-mile radius of all nest sites in the breeding area that have been active within 5 years.

**No-action alternative**

The option of maintaining the status quo and continuing present management activities; the proposed project would not be implemented.

**Nonforested area**

A naturally occurring area where trees do not establish over the long term, such as a bog, natural meadow, avalanche chute, and alpine areas.

**Old growth**

For this analysis, old growth is defined as stands that meet the minimum criteria (number of trees per acre that have a minimum dbh and a minimum age) for a given site (old-growth group from habitat type). These minimums can be found in the *Green et al Old Growth Forest Types of the Northern Region*.

**Open-Road Densities**

Percent of the grizzly bear subunit exceeding a density of 1 mile per square mile of open roads.

**Overstory**

The level of the forest canopy including the crowns of dominant, codominant, and intermediate trees.

**Patch**

A discrete area of forest connected to other discrete forest areas by relatively narrow corridors; an ecosystem element (such as vegetation) that is relatively homogeneous internally, but differs from what surrounds it.

**Potential nesting habitat (bald eagle)**

Sometimes referred to as 'suitable nesting habitat,' areas that have no history of occupancy by breeding bald eagles, but contain the potential to do so.

**Project file**

A public record of the analysis process, including all documents that form the basis for the project analysis. The project file for the Dog/Meadow Timber Sale project Ea is located at the Stillwater State Forest office near Olney, Montana.

**Redds**

The spawning ground or nest of various fish species.

**Regeneration**

The replacement of one forest stand by another as a result of natural seeding, sprouting, planting, or other methods.

**Residual stand**

Trees that remain standing following any cutting operation.

**Road-construction activities**

In general, the term 'road construction activities' refers to all the activities conducted while building new roads, reconstructing existing roads, and obliterating roads. These activities may include any or all of the following:

- road construction;
- right-of-way clearing;
- excavation of cut/fill material;
- installation of road-surface and ditch-drainage features;

- installation of culverts at stream crossings;
- burning right-of-way slash;
- hauling and installation of borrow material; and
- blading and shaping road surfaces.

**Road improvements**

Construction projects on an existing road to improve ease of travel, safety, drainage, and water quality.

**Saplings**

Trees 1 to 4 inches in diameter at breast height.

**Sawtimber trees**

Trees with a minimum dbh of 9 inches.

**Scarification**

The mechanized gouging and ripping of surface vegetation and litter to expose mineral soil and enhance the establishment of natural regeneration.

**Scoping**

The process of determining the extent of the environmental assessment task. Scoping includes public involvement to learn which issues and concerns should be addressed and the depth of assessment that will be required. It also includes a review of other factors such as laws, policies, actions by other landowners, and jurisdictions of other agencies that may affect the extent of assessment needed.

**Security**

For wild animals, the freedom from the likelihood of displacement or mortality due to human disturbance or confrontation.

**Security Core**

Percent of grizzly bear subunit that is greater than 500 meters from potential motorized disturbance.

**Security habitat (grizzly bears)**

An area of a minimum of 2,500 acres that is at least .3 miles from trails or roads with motorized travel and high-intensity

nonmotorized use during the nondenning period.

**Seedlings**

Live trees less than 1 inch dbh.

**Sediment**

In bodies of water, solid material, mineral or organic, that is suspended and transported or deposited.

**Sediment yield**

The amount of sediment that is carried to streams.

**Seral**

Refers to a biotic community that is in a developmental, transitional stage in ecological succession.

**Shade intolerant**

Describes the tree species that generally can only reproduce and grow in the open or where the overstory is broken and allows sufficient sunlight to penetrate. Often these are seral species that get replaced by more shade-tolerant species during succession. In Stillwater State Forest, shade-intolerant species generally include ponderosa pine, western larch, Douglas-fir, western white pine, and lodgepole pine.

**Shade tolerant**

Describes tree species that can reproduce and grow under the canopy in poor sunlight conditions. These species replace less shade-tolerant species during succession. In Stillwater State Forest, shade-tolerant species generally include subalpine fir, grand fir, Douglas-fir, Engelmann spruce, and western red cedar.

**Siltation**

The process of very fine particles of soil (silt) settling. This may occur in streams or from runoff. An example would be the silt build-up left after a puddle evaporates.

**Silviculture**

The art and science of managing the establishment, composition, and growth of forests to accomplish specific objectives.

**Site preparation**

A hand or mechanized manipulation of a harvested site to enhance the success of regeneration. Treatments are intended to modify the soil, litter, and vegetation to create microclimate conditions conducive to the establishment and growth of desired tree species.

**Slash**

Branches, tree tops, and cull trees left on the ground following a harvest.

**Snag**

A standing dead tree or the remaining portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife.

**Snow intercept**

The action of trees and other plants in catching falling snow and preventing it from reaching the ground.

**Spur roads**

Low standard roads, constructed to meet minimum requirements for harvest-related traffic.

**Stand**

An aggregation of trees occupying a specific area that are sufficiently uniform in composition, age arrangement, and condition so as to be distinguishable from the adjoining forest.

**Stand density**

Number of trees per acre.

**Stocking**

The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard, which is an estimate of either the basal area or number of trees per acre required to fully use the growth potential of the land.

**Stream gradient**

The slope of a stream along its course, usually expressed in percentage, indicating the amount of drop per 100 feet.

**Stumpage**

The value of standing trees in the forest. Sometimes used to mean the commercial value of standing trees.

**Succession**

The natural series of replacement of one plant (and animal) community by another over time in the absence of disturbance.

**Suppressed**

The condition of a tree characterized by a low-growth rate and low vigor due to competition.

**Temporary road**

Roads built to the minimal standards necessary to prevent impacts to water quality and provide a safe and efficient route to remove logs from the timber sale area. Following logging operations, reclamation would incorporate the following concepts to discourage future motorized use of the roads:

- Segments near the beginning of the new temporary road systems would be reshaped to their natural contours and reclaimed for approximately 200 feet by grass seeding and strewing slash and debris.
- The reclamation of the remaining road would include a combination of ripping or mechanically loosening the surface soils on the road, removing culverts or bridges that were installed, spreading forest debris along portions of the road, and allowing the surface to revegetate naturally.

**Texture**

A term used in visual assessments indicating distinctive or identifying features of the landscape, depending on distance.

**Thermal cover**

- For white-tailed deer, thermal cover has 70 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

- For elk and mule deer, thermal cover has 50 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

**Timber-harvesting activities**

Refers to all the activities conducted to facilitate timber removal before, during, and after the timber is removed. These activities may include any or all of the following:

- felling standing trees and bucking these trees into logs;
- skidding logs to a landing;
- processing, sorting, and loading logs onto trucks at the landing;
- hauling logs by truck to a mill;
- slashing and sanitizing residual vegetation damaged during logging;
- machine piling logging slash;
- burning logging slash;
- scarifying and preparing the site for planting; and
- planting trees.

**Total Road Densities**

Percent of grizzly bear subunit with more than 2 miles per square mile of total road.

**Understory**

The trees and other woody species growing under a, more or less, continuous cover of branches and foliage formed collectively by the overstory of adjacent trees and other woody growth.

**Uneven-aged stand**

Various ages and sizes of trees growing together on a uniform site.

**Ungulates**

Hoofed animals, such as mule deer, white-tailed deer, elk, and moose, that are mostly herbivorous and many are horned or antlered.

**Vigor**

The degree of health and growth of a tree or stand of trees.

**Watershed**

The region or area drained by a river or other body of water.

**Water yield**

The average annual runoff for a particular watershed expressed in acre-feet.

**Water yield increase**

Due to forest canopy removal, an increase in the average annual runoff over natural conditions.

**Windthrow**

A tree pushed over by wind.

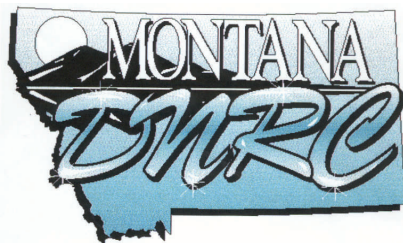
Windthrows (blowdowns) are common among shallow-rooted species and in areas where cutting or natural disturbances have reduced the density of a stand so that individual trees remain unprotected from the force of the wind.



## ACRONYMS

ARM	Administrative Rules of Montana	Mbf	thousand board feet
BMP	Best Management Practices	MCA	Montana Codes Annotated
dbh	diameter at breast height	MEPA	Montana Environmental Policy Act
DEQ	Department of Environmental Quality	MMbf	million board feet
DFWP	Montana Department of Fish, Wildlife and Parks	MNHP	Montana Natural Heritage Project
DNRC	Department of Natural Resources and Conservation	NCDE	Northern Continental Divide Ecosystem
EA	Environmental Assessment	NWLO	Northwestern Land Office
EIS	Environmental Impact Statement	RMZ	Riparian Management Zone
FI	Forest Improvement (fund)	SFLMP	State Forest Land Management Plan
FNF	Flathead National Forest	SLI	stand-level inventory
GIS	Geographical Information System	SMZ	Streamside Management Zone
ID Team	Interdisciplinary Team	TMDL	total maximum daily load
Land Board	Board of Land Commissioners	USFS	United States Forest Service
LAU	Lynx Analysis Unit	USFWS	United States Fish and Wildlife Service

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